ANNUAL CONFERENCE
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INDIAN SOCIETY OF WEED SCIENCE
1984
APRIL 4 - 5, 1985

ABSTRACTS OF PAPERS

B. A. COLLEGE OF AGRICULTURE
GUJARAT AGRICULTURAL UNIVERSITY
ANAND CAMPUS, ANAND 388 110. Gujarat

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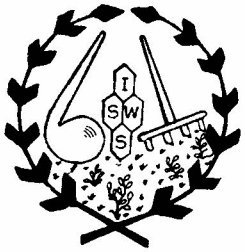

ALL INDIA CO-ORDINATED RESEARCH PROGRAMME ON WEED CONTROL

B. A. COLLEGE OF AGRICULTURE
GUJARAT AGRICULTURAL UNIVERSITY
ANAND CAMPUS, ANAND 388 110. GUJARAT

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WEED CONTROL IN RICE

BUTACHLOR FOR EFFECTIVE TIME OF APPLICATION FOR CONTROL OF WEEDS IN RICE NURSERY

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Hand weeding in rice nursery is laborious, ineffective and expensive. Six replicated trials, using butachlor, a pre-emergence rice herbicide were conducted on sandy loam soils (pH 8.5) of haryana during the 1984 kharif season. Applications of butachlor were made 4 days before sowing (4 DBS) at rates of 0.75, 1.25 and 1.75 kg. ai/ha. These treatments were compared to treatments made 6 days after sowing (DAS) at rates of 0.75, 1.0 and 1.25 kg. ai/ha in a split plot design. Crop injury I.E. Percent stand reduction. Percent growth reduction, and percent weed control by species were determined 10, 20 and 30 DAS.

Applications made 4 DBS provided the most effective weed control but were found to be injurious to rice at higher rates. In contrast, applications made 6 DAS were safe to rice seedlings but provided inadequate weed control. The most effective weed control, coupled with safety to rice seedlings, was obtained from applications made 4 DBS at 0.75 kg. ai/ha on light soils and at 1.25 kg. ai/ha on heavy soils.

EFFECT OF HERBICIDE RATES ON RICE NURSERY AND ASSOCIATED WEEDS

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PANTNAGAR (NAINITAL)-263 145

Butachlor, thiobencarb, pendimethalin and oxyfluorfen each at three rates of appliation were tested for weed control in rice nursery beds. Herbicides were applied 6 days after seeding of sprouted rice seeds in puddled nursery beds. **Echinochloa colonum** and **Cyperus rotundus** were present in the experimental field where **E. colonum** alone constituted more than 90% of the total weed population.

Density and dry weight of weeds were reduced significantly due to application of herbicides. Dry weight of weeds was reduced with the increase in the rates of butachlor. However, incase of other herbicides dry matter production by weeds did not differ much at different rates. The number of rice seedlings recorded at 20 days after seeding was almost similar in all the treatments. Dry weight of rice seedlings was not affected due to butachlor at 1.0 kg/ha and thiobencarb at 1.0, 1.5 and 2.0 kg/ha.

HERBICIDES TO CONTROL WEEDS IN PADDY NURSERY

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To manage the weeds in paddy nursery, three herbicides viz., thiobencarb 1.5, 2.0 kg/ha at 8 days after sowing (DAS), oxadiazon 0.75, 1.0 kg/ha pre em and pendimethalin 0.75, 1.0 kg/ha pre em were tested against hand weeding 1 (15 DAS) and a weedy check at two locations during 1983 and 1984. The weeds infesting the nursery were **Cyperus iria, Cyperus rotundus L., Phyllanthus niruri, Ageratum conyzoides L., Digitaria adscendense Henr., Cynodon dactylon Pers., Echinochloa crusguli Beauv., Portulata oleracea L., Commelina communis** and **Eclipta alba Hassk.** The highest weed control efficiency was found in oxadiazon 1.0 kg/ha followed by oxadiazon 0.75 kg/ha pre em and pendimethalin. Oxadiazon controlled effectively sedges, grasses and dicot weeds except **Cyperus rotundus, Cynodon dactylon, Commilina communis** and **Eclipta alba.** Thiobencarb controlled only **Echinochloa crusgalli** but could not controlled dicot, sedges, **Cynodon dactylon** and **Digitaria adscendense.** These herbicide did not show any adverse effects on crop emergence and seedling growth during both the years. Hence, according to weed-types these herbicides can be used to control weeds in paddy nursery.

WEED MANAGEMENT IN RICE NURSERY IN HIMACHAL PRADESH

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A field experiment having 15 treatments replicated 3 times in a randomised block design was conducted at the Research Farm of HPKVV, Palampur, during Kharif 1984. The objective of the experiment was to evaluate the relative efficacy of thiobencarb, butachlor and oxadiazon applied 7 and 14 days after sowing (DAS) at the rates of 1.0 and 1.5 kg a.i/ha in controlling weeds in rice nursery. These chemicals were also compared with unweeded check and handweeding practice.

Echinochloa crusgalli, E. Colonum, Cyperus iria, Commelina benghalensis and **Digitaria sanguinalis** were the predonimant weed species in the rice nursery. The dry weight and density of weeds was found to reduce significantly with all the herbicides at both rates and time of application as well as hand weeding operation. However, oxadiazon applied at the rate of 1.0 kg/ha 14 DAS resulted in maximum reduction in dry weight of weeds followed by butachlor 1.0 kg/ha applied 7 DAS. Higher rate (1.5 kg/ha) of oxadiazon caused phytotoxicity to rice seedlings which could recover later and produced a good crop of rice.

WEED MANAGEMENT IN RICE NURSERIES UNDER WETLAND CONDITIONS

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Butachlor and thiobencarb at 1.5 kg/ha and pendimethalin at 1.0 kg/ha were applied as pre-plant, 4 days and 7 days after sowing and their effectiveness in controlling weeds in rice nurseries was evaluated in pot culture and large size demonstration plots at different locations.

Application of all the herbicides at 4 days after sowing gave good 80-90% weed control, but caused 30-40 per cent injury to the rice seedlings. Application of herbicides at 7 days after sowing gave 15-17% injury to the crop, but weed control was 15-30%. Application of pendimethalin as pre-plant gave 65 per cent control of weed without any injury to the seedlings.

ECONOMIC AND BROAD SPECTRUM WEED CONTROL IN TRANSPLATED RICE

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Field experiments were conducted in Tamil Nadu Agricultural University, Coimbatore during Kharif and winter seasons of 1983-84. Effect of individual application of pre-emergence herbicides viz. butachlor 1.5 kg/ha, fluchloralin 0.8 kg/ha, oxadiazon 0.75 kg/ha, thiobencarb 1.5 kg/ha and 2,4-DEE 0.8 kg/ha followed by hand weeding and mixtures of 2,4-DEE 0.5 kg/ha with butachlor 1.0 kg/ha, fluchloralin 0.5 kg/ha, oxadiazon 0.5 kg/ha and thiobencarb 1.0 kg/ha with and without hand weeding was studied The dominat weed was **Echinochloa crusgalli** (L.) Beauv. in grasses, **Cyperus difformis** L. in sedges and **Eclipta alba** (L.) Hassk in broad leaved weeds. High weed control index and weed control efficiency were noticed in herbicide mixtures. Thiobencarb mixture plus hand weeding gave higher grain yield of 5 kg/ha in kharif and 4828 kg/ha in winter. Application of herbicides mixture (butachlor, thiobencarb, oxadizon and fluchloralin with 2, 4-DEE) was cheaper than the individual application of the above herbicides. There was no residual toxicity of herbicides to the succeeding crops such as cowpea, black gram, soybean, gingelly, fingermillet and cotton.

BENTHIOCARB FORMULATIONS FOR WEED CONTROL IN TRANSPLANTED RICE

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Two formulations of Benthiocarb, at different rates and time of application were tested for weed

control in transplanted rice (**Oryza sativa** L. cv. Saket-4), in kharif 1984. Benthiocarb new formulation and Benthiocarb old formulatin at 1.0 and 1.50 kg ai/ha were compared with Benthiocarb + 2,4-D.E.E. at 1.0 and 1.50 kg ai/ha, Fluchloralin + 2, 4-D.E.E. at 0.90 and 1.12 kg ai/ha. hand weeding 30 days after transplanting (DAT) and untreated control. Branyard grass (**Echinochloa** spp.) was the major weed There were significant reduction in number of barnyard grass and dry weight of weeds due to Benthiocarb as recorded at 45 DAT. Grain yield in crop under Benthiocarb old formulation, Benthiocarb + 2, 4-D.E.E. at both rates and Benthiocarb new formulation at 1.0 kg. ai/ha was comparable with that in hand weeded plot.

WEED MANAGEMENT AND NITROGEN INTERACTIONS IN TRANSPLANTED RICE.

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Field experiments to study the responses in transplanted rice to nitrogen application under different weed management levels were conducted during Kharif 1983 and 1984. Nine possible treatment combinations of 3 Nitrogen levels (40, 80 and 120 kg/ha) and 3 weed management practices (unweeded check, two handweedings, and Pre-emergence application of thiobencarb 2.0 kg/ha) were tested in randomised block design with 4 replications.

During both the years, the grain yield of rice increased linearly with increasing does of N upto 120 kg/ha when no weed control measure was adopted, but such an increase in the yield was noticed upto 30 kg level in hand weeded or thiobencarb treated plots. The optimum does of N was worked out to be 81 kg/ha, at which the profit was Rs. 1,779/- in hand weeding treatments and in thiobencarb treatment the optimum does was 85 kg/ha with profit of Rs.2,324/- per hectare. Vield attributes such as number of panicles per hill and number of spikelets per pgnicle were significantly higher under hand weeding and thiobencarb treatments compared to unweeded check, which also increased significantly with increase in N upto 80 kg/hs.

Dry weight of weeds at harvest was significantly lowest in hand weeded plots followed by thiobencarb treated plots,whereas unweeded plot maintained significantly highest weed weight. The used dry weight was, however, not altered significantly by graded levels of nitrogan.

CHEMICAL WEED CONTROL IN TRANSPLANTED IR. 50 RICE

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A field trial was conducted to study the comparative efficiency and suitable time of post emergency application of five new herbicides namely Rilof (Piperophos), Rifit (Pretilachlor) Arrosolo (Molinate + Propanil), Ordram (Molinate) and Ronstar (Oxadiazon) in transplanted IR.50 Rice during July - October

(Kuruvai) 1984 at Annamalai University, Experimental Farm, Annamalainagar. A weedy check (unweeded control) and a weed Free check (twice handweeded) were also included in the study. Arrosolo and Rifit recorded highest weed control efficiency, favourably induced growth and yield characters of rice and recorded hiohest straw and grain yields. Weed Free check was on par with the Arrosolo and Rifit in the above aspects. Ronstar wasnext in order. These treatments were significantly superior to Ordram and Rilof treatments which were on par with weedy check in most of the aspects except weed control efficiency. The two different dates of application of herbicides viz., 15 DAT 20 DAT had no significant difference.

EFFICIENCY OF AZOLLA FOR WEED CONTROL IN RICE ECOSYSTEM

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A field experiment was conducted in the sandy soils of the Agronomic Research station, Chalakkudy, Kerala during Kharif season 1982 to evaluate the efficiency of dual culturing of Azolla for controlling weeds in rice. The treatments consisted of combinations of six leavels of azolla inoculation (0.0, 0.1, 0.2, 0.3, 0.4 and 0.5 kg/m^2, and four weed control treatments (unweeded control, complete weed control, and weeding at 15 and 30 DAP and hand weeding at 15 and 30 DAP). Azolla inoculation @ 0.5 kg. m^2 recorded significant reduction in weed dry matter production and removal of nutrients (N, P and K) by weeds. Among weed control treatments unweeded control recorded the maximum weed growth. However, combinations involving this treatment with higher levels of azolla inoculation recorded significantly lower weed dry matter production than the treatments without azolla inoculation. Azolla inculation at 0.5 kg/m^2 and complete weeding treatments favourably influenced the growth characters and yield of rice like height of plants. LAI, No of panicles, No of filled grains and 1000 grain weight, ultimately resulting in increased grain yields of rice and lower weed indices.

WEED CONTROL EFFICIENCY OF DIFFERENT HERBICIDES IN TRANSPLANTED KHARIF RICE.

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SRINIKETAN 731 236

Three field experiments were conducted at the Agricultural Farm, Institute of Agriculture, Visva-Bharati University Sriniketan, West Bengal, India on transplanted Kharif rice (cv. Pusa 33-30) during 1978-80. Predominant weed flora were **Ammania baccifera** L., **Fimbristylis miliacea** Vahl., **Cyperus microiria** steud. **Ludwigia parviflora** Roxb., **Monochoria vaginalis** Presl. and **Dopatrium junceum** Hamilt. Broad leaved weeds constituted 66.51%, followed by sedge 23.66%) and grass (9.83%) weeds. Weed density and dry weight were maximum (364.6 kg/ha) at 45 days after transplanting (DT) indicating the fact that the critical period of weed competition was upto 45 DT. Among the herbicidal treatments post-emergence (post-em) herbicide propanil + Na-2, 4-D (EC & WP) significantly reduced the

weed population immediately after application (at 45 DT) with lower lasting effect showing some reappearance of weeds, whereas granular (G) forms of preemergence (pre-em) herbicides had shown more lasting effect on persistent suppression of weed population. Among the pre-em herbicides butachlor and 2,4-D(G) herbicides showed more effectiveness in checking weed density however, in case of dry weight of weeds 2, 4-D (G) herbicides showed maximum reduction which was followed by nitrofen (G) and butachlor (G) and the later treatments were at par with post-em herbicide. Pre-em 2, 4-D EE and 2, 4-D IPE(G) at 1.0 kg each showed the highest (94.23% and 94.64%) weed control efficiency (WCE) at 45 and 60 DT respectively. This was followed by 2, 4-D EE 1.5 and 1.0 Kg, 2, 4-D IPE 1.5 kg, post-em propanil + Na-2, 4-D and pre-em nitrofen which had more than 80% WCE whereas, pre-em butachlor had 76.58% WCE at 60 DT. Among weed control treatments 2, 4-D IPE 1.0 Kg produced the hgihest and 30.28% (9.38 q/ha) more grain yield and the best weed index (WI) value (3.34) and this was even better than cultural treatment namely, hand weeding (twice). The efficiency of other treatments were in the order of nitrogen, 2, 4-D IPE 1.5 Kg, 2,4-D EE 1.0, 1.5 Kg, butachlor and post-em propanil + Na-2, 4-D (17,87). All weeding treatments (chemical and cultural) however, proved significantly superior to no-weeding in terms of WI.

CHEMICAL WEED CONTROL IN UPLAND RICE IN HILLY TERRAINS OF MEGHALAYA

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ICAR Research Complex for NEH Region,
SHILLONG

Experiments conducted on upland rice crop at ICAR Research Complex Farm, Barapani (Meghalaya) during 1983 and 1984 with an object to study the effectiveness of adjuvants as a tank mix with herbicide or supplementing the need of herbicide. Benthiocarb @ 1.5 kg ai/ha as pre-emergence controlled the weeds quite effectively over hand weeding. Application of 2, 4-D @ 0.5 kg ai/ha as post emergence or tank mixture of any of the adjuvant (Triton X-100 @ 0.5% v/v or urea 1% w/v) with herbicide did not increase the grain yield and also did not reduce the intensity as well as dry matter of weeds under investigation

COMBINED FORMULATIN OF FLUCHLORALIN AND 2,4-D COMPARED WITH OTHER RICE HERBICIDES FOR WEED CONTROL IN TRANSPLANTED RICE

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From the field experiment on the Agricultural College Farm at Visva-Bharati University located at the centre of lateritic rice belt of W.Bengal having slightly acidic sandyloam soil with medium fertility

status, it was found that a dose of 0.90 kg ai/ha of 45 EC ready made combination product of Fluchloralin (20% ai) + 2,4-D EE (25% a.e.) applied at 3 DAT showed remarkable improvement in its efficiency to have a greater reduction in total weed population, dry weight of weeds as well as corresponding increase in the yield of transplanted rice than single application of flunchloralin at 0.675 or 0.90 kg ai/ha at one DBT. This combination product showed broadspectrum weed control in transplanted rice by suppression of grasses by fluchloralin and control of broadleaved and sedges by 2,4-D. When compared with other broadspectrum rice herbicides, the results revealed that preemengence application of thiobencarb E.C. (2.5 kg ai/ha), butachlor EC (1.5 kg and 2.0 kg ai/ha) did not differ significantly in checking the weed population, weed dry weight and increase in yield of crop. A higher dose (1.25 kg ai/ha) of 45 EC formulation of combination product of + 2,4-D EE however showed a trend of better parformance in reducing weed growth and increase in yield of crop but statistically it was not superior to the lower dose of (0.90 kg) of this combined product. The traditional cultural operation (hand weeding twice) was however superior to all the herbicidal treatments, while the other culturalmethod of using rotary weeder (twice) in controlling weeds in transplanted rice was statistically at par with 45 EC combination product of Fluchloralin + 2,4-D EE at both the doses, butachlor, benthoicerb and bentazon herbicides.

STUDIES ON WEED EMERGENCE PATTERN IN TRANSPLANTED RICE.

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In an experiment conducted at Rice Research Station Kaul in Haryana state during kharif, 1980 and 1981 maximum weed population was recorded in June 16 transplanted crop. Total weed population decreased with delay in transplanting from June 16 to July 1 and to July 16. Weed species **Echnochloa crus-galli, E. colonum, Cyperus Iria, Eclipta alba** and **Paspalum disticum** were all found more in June 16 tansplanted crop than July 1 and July 16 transplanted ones. Dry matter production and nitrogen uptake by weeds was recorded maximum in June 16 transplanted crop and least in the July 16 transplanted one. Thus, the June 16 transplanted crop has faced heavy competition from weeds than July 1 and July 16 transplanted crop. Weed density, dry matter production and nitrogen uptake by total weeds decreased with increase in the duration of weed free maintenance upto intital 45 days after which there was poor emergence of weeds as the crop has developed enough canopy. The major flushed of the weeds have emerged during the period from 15th to 45th day of transplanting. **Echinochloa crus-galli, E.colonum, Cyperus iria** and **Eclipta alba** have emerged maximum during first 45 days after transplanting. Weed free maintenance for initial 45 days, therefore, reduced their population, dry matter production and the nitrogen uptake at subsequent successive stages of the crop growth when compared to the weedy check. It was only the **Paspalum disticum** which has emerged after 30 days of transplanting where too, weed free maintenance of 45 days found enough to have controlled it.

STUDIES INTO THE EFFICACY OF DIFFERENT HERBICIDES FOR WEED CONTROL IN TRANSPLANTED RICE

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Punjab Agricultral University PUNJAB

Problem of weed control in rice has become more serious now-a days due to the cultivation of nitrogen-responsive. highyielding varieties that too where the intensity of cropping is very high and the time left out for preparatory tillage is very less Under such conditions, chemical weed control is the ony alternative. Field experiments were conducted at the Punjab Agricultural University, Rice Research Station, Kapurthala during Kharif 1981-1983 in transplanted rice to identify certain herbicides which could prove effective against the pre-dominant weed flora of the region, i.e. **Echinocloa Crus-galli L., Echinocloa colonum, L.** and **Cyperus Spp.** The results obtained indicated that 2,4-D ethyl ester, oxyfluorofen, oxadiazon, benthiocarb and pendimethalin @ 1.0, 0.15, 0.6, 1.5 and 1.5 kg ai per hectare respectively were quite effective herbicide for controlling weeds in transplanted rice when applied at preemergence stage within 4 days of transplanting. These herbicides were at par with butachlor (the established standard herbicide in rice) in controlling weeds. If the weeds were allowed to compete with the crop plants, the loss in grain yield ranged from 31.3 per cent in 1983 to 44.4 per cent in 1982

COMPARATIVE EFFICIENCY OF DIFFERENT WEEDICIDES IN CONTROLLING WEEDS IN TRANSPLANTED PADDY.

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KHARAGPUR-721 302

An experiment was carried out in wet season (July-Nov) 1981 to find out the comparative efficiency of different weedicides and their effective concentration to control weeds in transplanted paddy. The weedicides were applied singly as well as in combination. Hand weedings and unweeded control were included for comparison. **Echinochloa colonum, Cynodon dactylon, Fimbristylis mileacea, Oldenlandia corymbosa, Rotala indica, Alternanthera sessilis, Hydrolea zeylanica, Ammania baccifera, Sesbania bispionsa, Scirpus sp.** and **Eriocaulon sieboldianum** were the predominant weeds. All the weedicides at 2.0 to 4.0 kg a.i/ha singly or 1.0 to 2.0 kg ai/ha in combination as well as two hand weedings reduced dry matter of weeds significantly over unweded control. The reduction was to the extent of 70.18 kg/ha and the weed control efficiency was estimated to be 88.74 per cent. The grain yields under single application of butachlor, thiobencarb, propanil and nitrofen at 2.0 and 3.0 kg ai/ha were apparently lower than pre-emergency application of thiobencarb followed by post-emergence application of propanil each at 1.0 kg ai/ha recorded the maximum grain yield and minimum dry matter of weeds of 46.5 g/ha and 8.89 kg/ha respectively

NUTRIENT UP TAKE AND GRAIN YIELD OF TWO RICE CULTIVARS AS AFFECTED BY WEED COMPETITION UNDER TWO METHODS OF PLANTING AND SIX WEED MANAGEMENT PRACTICES

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Nutrient up take studies revealed that uptake of N. P, K at harvest was more by 17.25, 2.49, and 11.01 kg/ha respectively in transplanting situation over broadcasting situation and N, P, K by weeds was minimised by 34.8%, 25.25% and 32.8%,respectively in transplanting situation as compared to broadcasting situation. Among two cultivars studied nutrient uptake of cultivar IR-50 was more than that the Tellahamsa. In weedy control plots NPK removal by weeds was reduced by 11.87%, 14.41% and 12.70% respectiely due to cultivar Tellahamsa alone as compared to IR-50. This is attributed to weed growth smothering nature of Tallahamsa. However response to weed control was more with IR-50 than Tellahamsa.

Nutrient removal by weeds was as high as 30.51, 6.52 and 25 kg NPK/ha respectively in weedy control plots. This was minimised to 2.55 0.85 and 2.58 kg NPK/ha respectively in hand weeding treatment thich has given highest grain yield among all the weed management treatuments and 9.36 1.87 and 6.87 kg NPK/ha in Fluchloralin + 2,4-D Et treatment which is next best to thand weeding under transplanted situation.

Nutrient up take and grain yield of rice when treated with Pendimethalin and Oxidiazon treatments was comparable to hand weeding under broadcast seeded rice cultivation.

EFFECT OF HERBICIDES AND WATER SUBMERGENCE LEVELS ON CONTROL OF WEEDS IN TRANSPLANTED RICE.

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Haryana Agricultural University, HISAR.

Field experiment on weed control in transplanted rice involving three herbicides under three levels of submergence was conducted at Rice Research Station Kaul (Haryana) in kharif 1980 and 1981. The study revealed that pre emergence application of butachlor 5 G @ 1.5 kg/ha, Oxadiazon 2 G @ 0.75 kg/ha and Pendimethalin 3 G @ 1.5 kg/ha provided reasonable weed control resulting in higher grain yield of rice than the untreated control. Where herbicides were used. 0-5 cm submergence was found sufficient for desired weed control and grain yield of rice.

WEED CONTROL IN IRRIGATED UPLAND DIRECT SEEDED RICE IN NORTH WESTERN INDIA

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Indian Agricultural Research Institute,
NEW DELHI-110 012

Field investigations were carried out at the farm of the Indian Agricultural Research Institute, New Delhi during kharif seasons of 1982 and 1983 on the interactive effects of methods of growing wetland rice (broadcast, drilled and transplanted) and weed control measures (repeated hand weedings and use of herbicides). The soil of exerimental field was highly permeable sandy clay loam.

Under unweeded condition, the transplanted crop significantly outyielded (41.0 q/ha) the direct seeded on (4.5 q/ha) but when the weeds were controlled either through repeated weedings or spraying butachlor at 1.0 kg/ha as pre-emergence supplemented with one hand weeding at 20-25 days after seeding, the wetland direct seeded crop either broadcast or drilled, registered the grain yield at par with the transplanted crop.

WEED MANAGEMENT IN RAINFED DIRECT SOWN LOWLAND RICE

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Orissa University of Agriculture and Technology,
BHUBANESWAR-751 003

The effective weed management in direct sown lowland rice with bushening at different times alone and in combination with herbicide application and with normal manual weeding operation, have been evaluated in a field trial at O.U.A.T. Agricultrual Farm, Bhubaneswar during the monsoon season of 1984. The treatents were replicated thrice and laid out in a randomised block design. There were more grasses (37.81%) and sedges (54.06 %) than broad leaved weeds (8.13 %). The variety of rice grown was Mashuri. Oxadiozon @ 0.75 kg/ha has been applied as pre-emergence 3 DAS while propanil @ 2.0 lit/ha was applied as post emergence treatment at 18 DAS. Manual weeding operations were taken 7th day and 21st day following bushening operation. The soil of the experimental site was sandy loam with good fertility status.

The result of the experiment indicated that maximum mortality of weeds and maximum grain yield was obtained in treatment where herbicide (oxadiazon @ 0.75 kg/ha - 3 DAS) was supplemented with bushening operation in time (i.e. 30 DAS). This treatment recorded 8.30 % and 123.88 % higher yield over normal farmers practice of bushenign followed by two hand weedings and un-weeded control respectively. Delay bushening operation have recorded lower yield of grain. In such condition rice yield reduction due to un-checked weed competition was about 41.1 %.

WEED CONTROL IN UPLAND-DIRECT SOWN PADDY

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Five field experiments were conducted from 1979 to 1983 to evaluate the suitable methods of weed control in upland drilled paddy on medium soils at JNKVV, Jabalpur. The efficacy of eight herbicides viz., thiobencarb, butachlor, fluchloralin, molinate, nitrofen, oxadiazon, propanil and 2,4-D at different rates alone and in combinations with herbicides or hand weeding at 30 days after sowing was tested and compared with mechanical (hand hoeing) and mannual weeding with Khurpi.

The complex weed ecosystem consisted of **Cyperus iria, C. rotundus, Echinochloa crusgalli, Phyllanthus niruri, P. simplex, Commelina spp., Caesulia axillaris, Alysicarpus spp., Ageratum conyzoides, Cynodon dactylon, Eragrostis spp., Saccharum spontaneum, Sehima nervosum** and **Ludwigia parviflora.**

The studies revelated very unconsistant results on weed control and yields due to climatic and soil variations. None of the herbicides could control all the weed species of rice fields. The population of **Cyperus rotundus, Cynodon dactylon, Paspalum distichum,** and **Saccharum spontuneum** was not controlled by any herbicide as per em alone or pre em + post em treatments. Thiobencarb 2 to 3 kg/ha pre em, oxadiazon 1 to 1.5 kg/ha pre em or propanil 3 kg/ha post em can be used for control of specific weeds only. Two hand weedings can be substituted by pre em application of oxadiazon 1.0 kg/ha + 1 HW at 35 DAS. Mechanical weeding was not effective except during 1981

The herbicides did not show phytotoxic effects on crop except 2,4-D Nasalt 1.0 and 1.5 kg/ha pre em which caused reduction in germination. During 1979 and 1980 nitrofen gave maximum profit followed by oxadiazon 1.0 kg pre + one HW while in 1982 and 1983, 3-HW gave higher profit followed by thiobencarb 1.5 kg per em + propanil 1.0 kg post em.

COMPARATVE STUDY OF THIOBENCARB ON N UPTAKE AND DRAIN IN DIRECT SEEDED UPLAND RICE

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Field experiments were carried out to study the comparative efficiency of thiobencarb under different rates of nitrogen (30, 60 and 90 kg N/ha) in direct seeded rice during kharif seasons of 1982 and 1983 at Agricultural Research Farm of Banaras Hindu Univesity, Varanasi. Experiment consisted of 13 treatment combinatins of thiobencarb 1.25 and 1.5 kg ai/ha as pre-as well as post emergence, butachlor 1.5 kg ai/ha as pre-and propanil 1.5 kg ai/ha as post-emergence and one unweede control and one hand-weeding (thrice). Increasing rates of nitrogen increased the deplition as well as uptake of nitrogen. In general, combined application of herbicides was found much effective to their individual application in

increasing N uptake and arresting N loss by weeds. Pre-emergence application of thiobencarb 1.5 kg ai/ha with post-emergence application of propanil 1.5 kg ai/ha had maximum nitrogen uptake and minimum nitrogen drain by weeds throughout the crop growth stages. This was closely followed by combined application of butachlor as pre-and propanil as post-emergence. Amongst herbicides alone, thiobencarb 1.5 kg ai/ha as pre-emergence was found most effective in minimising the N deplition by weed and maximising the uptake of nitrogen by plant. Post emergence application of thiobencarb was not as effective as its pre-emergence applications.

RELATIVE EFFECTIVENESS OF CHEMICAL AND CULTURAL METHODS IN CONTROLLING WEEDS IN UPLAND RICE

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A field experiment was conducted to study the efficiency of different herbicides and cultural methods in controlling weeds of upland rice fields at the Dryland Research Farm, Birsa Agricultural University, Ranchi during kharif season of 1984. The results of the experiment showed that pre-emergence application of oxyfluorfen 0.1 kg/ha at one day after sowing effectively controlled all categories of weeds in upland rice fields from the very germination stage of the crop, recorded the lowest dry weight of weeds, highest number of panicles/m^2 and finally produced highest grain yield among other chemical and cultural treatments. Application of butachlor 2.0 kg/ha, benthiocarb 1.5 kg/ha, pendimethalin 1.5 kg/ha at one day after sowing and two hand weedings 15 days and 30 days after sowing may be considered as the second best weed control measures because these treatments were also found quite effective in controlling weeds and proudcing higher grain yield of rice than application of low doses of these chemicals and hand weeding once. Oxyfluorfen 0.2 kg/ha as pre-emergence spray although controlled the weeds very effectively but affected the germination of the crop resulting in very poor crop stand and ultimately produced very low grain yield. All weed control treatments whether chemical or cultural considerably reduced the weed population, recorded lower dry weight of weeds andhigher grain yield of rice than unweeded control treatment

CHEMCIAL WEED CONTROL IN UPLAND DRILLED PADDY

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To manage the complex weed community in upland drilled paddy var. Pusa 33, four herbicides viz., thiobencarb 2 kg/ha 8 days after sowing (DAS), Oxadiazon 1.0 kg/ha pre emergence (pre), 2.4-D Na Salt 1.0 kg/ha pre, pendimethalin 1.0 kg/ha pre and each with one hand weeding (HW) at 35 DAS were compared with one HW 20 DAS, two HW 20 + 40 DAS, two hoeings 20 + 40 DAS and a weedy check. The complex weed community consisted of **Cyperus iriaL., Cyperus rotundus L., Phyllanthus niruri,**

Trianthema monogyna, Echinochloa crusgalli Beavu., Digitaria adscendense Henr, Cynodon dactylon Pers., Physalis minima L., Eclipta alba Hassk. and **Commelina communisl.** Amongst herbicides alone, oxadiazon 1.0 kg/ha pre controlled effectively most of the weed population except **C. rotundus, C. dactylon** and **E. alba.** Thiobencarb controlled **E. crusgalli** only, pendimethalin was effective against annual grassy and dicot weeds while 2,4-D controlled **C. iria** affectively. However, weed biomass recorded at harvest was the lowest in thiobencarb followed by oxadiazon owing to the decomposition of the biomass of **C. iria** in the former. It was the highest in 2,4-D treated plots. The maximum weed control efficiency was found in oxadiazon 1.0 kg/he pre + one HW 35 DAS followed by two HW 20 + 40 DAS. 2,4—D Nasalt 1.0 kg/ha pre em affecte the crop germination while others did not show phytotoxic effects on crop. The highest grain yield was recorded under oxadiazon 1.0 kg/ha pre + one HW at 35 DAS (5091 kg/ha) followed by oxadiazon 1.0 kg/ha pre alone (4149 kg) and two HW 20 + 35 DAS (4080 Kg while weedy check and hand hoeing gave only 2166 kg and 2644 kg/ha respectively.

EFFICIENCY & ECONOMICS OF WEED CONTROL UNDER DIFFERENT METHODS OF DRY SOWN RICE.

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An experiment was conducted at J. N. Krishi Vishwa Vidyalaya, Research Station, Raipur (M.P.) during Kharif season of 1983-84 to find out the suitable method of weed control under different systems of different sown rainfed rice alongwith their economic feasibility is also discussed in paper. The experiment was laidout in split plot design with three seeding methods namely Broadcasting, Drilling by Datari seed drill 20 cm. apart rows (Pora method) and line sowing on the plough furrow line 30 cm. apart rows (Kera method) treated as main treatment and six weed management systems i.e. butachlor @ 2.0 kg ai/ha, butachlor1.0 kg + H.W. at 30 DAS, thiobencarb @ 2.0 kg ai/ha thiobencarb 1 kg + H.W. at 30 DAS. Two hand weeding at 30 and 60 DAS and unweeded check (control) were taken as subtreatment with four replications.

Amongst the three rice seeding methods, drilling by Datari seed drill & Line sowing on plough furrow were produced significantly higher grain yield (29.63 q/ha & 28.31 q/ha respectively) over traditional broadcast method if rice seeding. On making comparision amongst different weed management practices, cultural method of weed control i.e. hand weeding twice recorded lowest dry weed weight with highest weed control efficiency and highest grain yield (36.34 q/ha). However, the use of harbicides butachlor & thiobencarb @ 2 kg. ai/ha were found better over their lower doses.

CHEMICAL WEED CONTROL IN PUDDLE SEEDED RICE

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Field experiments were conducted at CRRI, Cuttack during the dry seasons of 1982 and 1983 with the objective of finding out an effective herbicide and its method of application for puddle seeded rice

The experimental field was predominatly infested by sedges viz . **Cyperus difformis, Cyperus iria, Scirpus sp., Fimbristylis miliacea** and dicots viz., **Sphenoclea Zeylanica** and **Marsilea quadifoliata.**

The yield reduction due to weeds was estimated to be 49.7 and 31.7 per cent respectively for 1982 and 1983. Among the test herbicides, the efficacy of a new non petrochemical based formulation of butachlor i.e. Machete EN was comparable to that of emulsifiable concentrate formulation of both butachlor and thiobencarb, applied at 1.0 kg ai ha. The efficacy of the herbicides did not differ irrespective of spray or sand mixed application of EC/EN with that of broadcast application in granular form. The price of new formulation of butachlor i.e. Machete EN is expected to be cheaper than the commercial formulation of E.C.

EFFECT OF TIME OF APPLICATION OF THIOBENCARB ON WEED CONTROL IN DIRECT SEEDED RICE

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In the field experiment during 1982 and 1983 thiobencarb at 1.00, 1.5 and 2.0 kg/ha was applied as pre-plant, pre-emergence and as post-emergence at 2 and 4 leaf stages of the crop.

Minimum weed density and dry matter production of weeds was recorded when thiobencarb was applied as pre-emergence. The effect of thiobencarb reduced when the herbicide was applied at 2 and 4 leaf stages of crop. The efficiency of thiobencarb was also poor when the application was made before sowing of crop. Uncontrolled weeds reduced the yield of rice by 80.97, 74.47 during 1982 and 1983, respectively. The grain yield of rice was significant higher when thiobencarb was applied at pre-emergence (54 54 q/ha) as compared to when it was applied as pre plant (39.04 q/ha) The application of thiobencarb at 2 and 4 leaf stage resulted in conspicously less yield and its attributes.

EFFECT OF SURFACTANT ON THE EFFICIENCY OF VARIOUS HERBICIDES IN DIRECT SEEDED RICE

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Oxadiazon, pendimethalin, butachlor and thiobencarb were applied alone and with 0.1 per cent selwet as pre-emergence treatment to direct seeded rice. During the years 1982 and 1983 the experimental area was heavily infested with **Echnocloa crussgali** and **Cyperus iria.**

Presence of weeds throughout the growing season reduced the yield of directed seeded rice by 75.88 per cent Weed control was acceptable with 1.5 kg thiobencarb and 1.0 kg/ha oxadiazon both with and without surfactant. Although butachlor at 1.5 kg/ha significantly increased the grain yield of rice over weedy check, its effect was significantly less than that of thiobencarb and oxadiazon. Addition of surfactant did not exhibit a significant influence on the population and dry weight of weeds.

STUDIES ON THE TIME OF WEED REMOVAL IN DRILLED RICE

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Experience during rainy seasons from 1981-1983 were conducted to find out the frequency of weeding in drilled rice under unpuddled conditions. **Echinochloa colonum** was the maior weed species constituting more than 90% of the total weed population.

Single weeding done either at 15, 30, 45 or 60 days after sowing (DAS) could not provide desired degree of weed control and grain yields were significantly lower than the weed-free treatment. Three weedings (15. 30 and 45 DAS) or four weedings (15, 30, 45 and 60 DAS) could minimize the crop-weed competition and produce grain yields at par with that of weed-free condition. There was non-significant difference between three weedings and four weedings with respect to grain yield, weed intensity and dry matter production by weeds The orain yields obtained with two weedings done either at 15 and 30 DAS or 15 and 45 DAS were similar to that obtained with three weedings done 15 30 and 45 DAS.

COMPARATIVE EFFICACY OF SOME HERBICIDES FOR WEED CONTROL IN DRILLED RICE

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Cyperus iria, C. rotundus and **Echinochloa colonum** were the most dominant weed species in the experimental field and together constituted 79.8% of the total weed population. Bifenox at 2.0 and 3.0 kg/ha, piperophos at 1.5 kg/ha and thiobencarb at 1 5 and 2.0 kg/ha were more effective in reducing density and dry matter of weeds. Two weeding (15 and 45 DAS) provided effective control of weeds.

Weedy condition caused 85.8% reduction in grain yield as compared to weed free treatment. All the treatments produced significantly more grain yield than weedy check. None of the herbicidal treatments produced grain yields at par with weed free treatment. Two weeding (15 and 45 DAS) treatment was almost at par with weed free treatment. There was no significant diference in grain yield produced with all the rates of anilofos. The orain yield produced with bifenox at 2.0 kg/ha was at par with 3.0 kg/ha and significantly higher over 1.0 kg/ha. The grain yield produced with piperophos at 0.5 and 1.0 kg/ha was at par and significantly lower than 1.5 kg/ha. The grain yield produced with thiobencarb at 1.5 and 2.0 kg/ha was at par and significantly higher over 1.0 kg/ha. Piperophos at 1.5 kg/ha and thiobencarb at 1.5 and 2.0 kg/ha produced grain yields at par. Piperophos at 1.5 and thiobencarb at 2.0 kg/ha produced grain yields at par with two weeding (15 and 45 DAS) treatment

WEED CONTROL IN VEGETABLES AND FRUIT CROPS

EFFICACY OF CULTURAL AND CHEMICAL WEED CONTROL METHODS IN POTATO

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Field experiments were conducted at the Vegetable Research Farm of Haryana Agricultural University, Hisar during 1979-80 and 1980-81 in autumn planted Potato, Var. Kufri Chandramukhi to evaluate the comparative performance of six pre-emergence herbicides viz. Fluchloralin (0.75 & 1.0 kh/ha), Pendimethalin (1.0 & 1.5 kg/ha), Metribuzin (0.5 & 1.0 kg/ha), Oxyfluorfen (0.1 & 0.2 kg/ha), Oxadiazon (1.5 kg/ha) and Alachlor (2.5/ha); three post-emergence herbicides viz. Nitrofen (1.5 kg/ha), Paraquat (0.5 kg/ha) and Bentazone (1.0 kg/ha) alongwith earthing up plus one hand weeding. Earthing up plus two hand weedings one hand weeding and two hand weedings with no earthing were compared with weedy check (no weeding). The results indicated that all the cultural as well as chemical weed control treatments significantly reduced the weed growth (number and dry weight of weeds) and increased tuber yield over control (no weeding) during both the years. Maximum tuber yield (278.8 & 266.3 q/ha) was obtained from the pre-emergence application of metribuzin @ 1.0 kg/ha and it was closely followed by Oxyfluorfen at 0.2 kg/ha.

EFFECT OF TIME OF WEED REMOVAL ON GROWTH AND YIELD OF POTATO

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The experiments were conducted at the Vegetable Research Farm of Haryana Agricultural University, Hisar during the rabi season of 1979-80 and 1980-81 to study the effect of time of weed removal on the growth and yield of potato. Seven treatments viz. weed removal at 2,4,6,8 and 10 weeks after planting (WAP) the crop were compared with weed free (weeding at 15 days interval) and Weedy check (no weeding). The results revealed that the total weed population increased up to 6 WAP and then reduced drastically in both the years. Dry weight of weeds was maximum in weedy check treatment followed by weeding at 10 WAP. However, the most critical period for crop weed competition fell between 4 to 6 WAP Maximum yield was obtained where field was kept weed free followed by weeding at 4 and 6 WAP during both the years. In weedy check plots the tuber yield of potato was reduced by 40-43%.

SCREENING OF DIFFERENT HERBICIDES FOR SELECTIVE WEED CONTROL IN POTATO (Solanum tuberosum L.)

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The field investigations were conducted for a period of three years during 1981-82, 1982-83 and 1983-84. The treatments comprised of Fluchloralin at 1.20 kg a.i/ha (pre-plant), Metribuzin at 0.70 kg a.i/ha (pre-emergence), Metoxuron at 2.00 kg a.i/ha (pre-emergence) Ametryne at 1.20 kg and 1.28 kg a.i/ha (pre-emergence), Oxyfluorfen at 0.10 kg and 0 15 kg ai/ha (pre-emergence), Terbutryne at 1.20 ko k.i/ha (pre-emergence), Isoproturon (Tolkan) at 0.50 kg ai/ha (pre-emergence) and Isoproturon (Graminon) at 0.375 kg ai/ha (pre-emergence). These treatments were compared with weeded (weed free) and unweeded (no hoeing) controls. It was found that no herbicidal treatment imparted any type of phytotoxic effect on the potato crop. All the herbicidal treatments significantly reduced the weed population and dry matter accumulation of weeds and produced better tuber yield as compared to unweeded control where no hoeing was done. Amongst the herbicidal treatments Metribuzin at 0.70 kg.ai/ha (pre-emergence) was proved to be statistically superior in reducing the weed population and dry weight accumulation of weeds leading to the production of maximum tuber yield which was at par with oxyfluorfen at 0.15 and 0.10 kg ai/ha

STUDIES ON CHEMICAL CONTROL OF WEEDS IN POTATO (Solanum tuberosum L.) CULTIVAR KUFRI CHANDRAMUKHI.

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The field investigations were conducted to study the efficacy of different weedicides on weed control and tuber yield in potato at Haryana Agricultural University, Hisar during 1981-82 and 1982-83. Metribuzin at 0.75 kg. ai/ha was the most effective weedicide in controlling the weeds in potato crop and gave tuber yield at par with weed free treatment followed by Pendimethalin 1.0 kg. ai/ha. Similarly the dry matter production by weeds was minimum under weed free and Metribuzin treatments whereas it was maximum under weedy check treatment.

STUDIES ON WEED CONTROL IN POTATOES

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Field studies were conducted at the farm of the Indian Agricultural Research Institute, New Delhi

during rabi seasons of 1982-83 abd 1983-84 on the comparative bioefficacy of some promising herbicides namely oxadiazon (at 0.50 and 0.75 kg/ha), Oxyfluorfen (at 0.2 and 0.3 kg/ha), acifluorfen (at 0.2 and 0.3 kg/ha) pendimethalin (at 0.75 and 1.0 kg/ha) and methabenzthiazuron (at 1.0 and 1.5 kg/ha) for control of weeds in potatoes. All the herbicides were applied as pre-emergence two days after planting of potato tubers. Hand weeding and unweeded control treatments were also included for comparison.

All the weed control treatments reduced significantly weed density and dry matter production as compared to unweeded control. Pendimethalin at 1 kg/ha and methabenz-thiazuron at 1.5 kg/ha appread to be superior to their lower dose. Highest tuber yield was recorded under pendimethalin at 1.0 kg/ha which did not differ significantly than the yield obtained under oxyfluorfen and acifluorfen at both the rates, methabenzthiaziazuron at 1.5 kg/ha and two hand weedings.

WEED CONTROL STUDIES IN POTATO (Solanum tuberosum)

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Linuron, diclofop-methyl, methabenzthiazuron and thiobencarb at three different rates of application were evaluated for weed control in potato. **Chenopodium album, Fumaria parviflora, Melilotus spp., Anagallis arvensis** and **Vicia sativa** were the major weed species in the experimental field.

All the herbicides caused significant reduction in density and dry matter production of weeds. Linuron at all the rates of application was more effective in controlling weeds than other herbicides. Potato tuber yield was reduced by 52.0% due no uncontrolled weeds. Diclofop-methyl at 1.0 and 1.5 kg/ha, methabenzthiazuron at 1.5 and 2.0 kg/ha and linuron at all the rates of application (0.5, 1.0 and 1.5 kg/ha) yielded significantly more tubers than weedy check. Linuron at 1.0 and 1.5 kg/ha produced tuber yields consistently at par with weed-free condition and higher than methabenzthiazuron.

EFFECT OF HERBICIDES WITH AND WITHOUT EARTHING UP IN POTATO.

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Field studies were conducted during 1983-84 at the College Agronomy Farm, Guiarat Agricultural University Anand, to evaluate the comparative performance of Fluchloralin (1.0 kg ai/ha) Diuron (0.500 kg ai/ha) and Paraquate (2.5 kg ai/ha) alongwith one handweeding (30 DAS) and two hand-weeding (30, 70 DAS) for weed control in potato (Cv Chandramukhi).

The results indicated that effect of herbicides were significant. Application of fluchloralin (202.3 q/ha) significantly increased tuber yield over unweeded control (116.5 q/ha) however, it was at par with one handweeding (172.5 q/ha) and two hand-weeding (180.4 q/ha). The differences between earthing up and no earthing up found not significant.

PENDIMETHALIN FORMULATIONS FOR WEED C POTATO

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Liquid & granular, formulations of pendimethalin, each at three different rate used as pre-emergence application, were tested for weed control in potato (cv. G-4 Allahabad Agricultural Institute. The effect of pendimethalin on the weeds was comp and untreated controls at 40 and 65 days after planting (DAP). The intensity of broac of the total number of weeds. Pendimethalin treatment, in general, reduced the **arvensis L., Spergula arvensis L.** and total number of weeds. On the basis of could not be clearly established that weed control had any effect on tuber number a was a clear trend.

EFFECT OF CYCOCEL ON THE PRODUCTIVITY POTATO

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To assess the utility of cycocel (also known as chloromequat or CCC or 2 ammonium chloride) in augmenting sweet potato productivity, an experiment wa consecutive years during 1981-84. Foliar application of Cycocel @ 5000, 1000 ar alongwith one absolute control and water spray (control). The crop (var. R responded significantly up to 500 ppm spray giving highest yield and income. There v in net return in comparison to absolute control.

WEED CONTROL IN ONION

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Five herbicide viz Oxadiazon @ 0.75 kg/ha Methabenzthiazuron @ 1.0 kg kg/ha, pendimethalin @ 1.0 kg/ha and sethoxydim (nabu) @ 0.3 and 0.4 kg/ha were weed free and weedy check (no wedding) at the Research Farm of Departmer H.A.U., Hisar during 1984. Oxadiazon, Methabenzthiazuron, fluchloralin and pendi control of broad leaved weeds. Total weight of weeds was lowest in oxadiazon follow yield was maximum where oxadiazon was applied followed by Methabenzthiazuron bulb yield by about 54% as compared to weed free

EVALUATION OF HERBICIDES AT THE FARMER'S FIELD ON ONION IN HARYANA

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Investigations were carried out at two places i.e. Danialpur (Karnal) and Chuharpur (Jind) villages of Haryana during the rabi season of 1981-82 to study the efficacy of three herbicides for weed control in onion variety Hisar -2. The treatments were pre-planting application of Basalin (Commercial) at 2.0 lit /ha. and Pre-emergence application of Tribunil (Commercial) at 1.25 kg/ha. and Ronstar (Commercial) at 3.0 lt./ha each alongwith one weeding (60 DAP), two manual weedings (30 and 60 DAP) and weedy check (no weeding). All the herbicidal treatments and two manual weedings gave significantly better yield over weedy check (no weeding). At Danialpur, maximum bulb yield was obtained where Ronstar at 3 lt./ha was applied ten days after transplanting plus weeding at 60 days which was closely followed by Tribunil at 1.25 kg/ha + weeding at 60 days and two manual weedinos. At Chuharpur, maximum bulb yield was obtained where Tribunil at 1.25 kg/ha was applied 10 days after transplanting plus weeding at 60 days which was closely followed by Ronstar at 3 lt/ha + weeding at 60 days and two manual weedings. Basalin at 2 lt./ha + weeding at 60 days significantly improved yield over weedy check but was inferior to other two weedicides tried at both the places.

COMPARATIVE EFFICACY OF HERBICIDES AND HAND WEEDING FOR THE CONTROL OF WEEDS IN ONION

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A field investigation was carried out in sandy loam soil of vegetable section of Bihar Agriculture College Farm. Sabour during rabi season of 1976-77 in three replications of Randomised Block Design. The main weeds in crop were **Cyperus rotundus, Setaria glauca, Cynodon dactylon, Nicotiana plumbaginifolia, Trianthema portulacastrum.** Four herbicides viz. alachlor (Lasso) 1.25 kg/ha and nitrofen (Tok E 25) 1.00 kg/ha as pre planting application and chloroxuron (Tenuron) 1.50 kg/ha and 2,4-D (Fernoxone) 1.00 kg/ha as post emergence were evaluated along with unweeded control and hand weedings (2,3 and 4 times). The result showed that early period of 40 days after transplanting was found to be most critical for weed competition. The pre planting application of alachlor 1.25 kg/ha and nitrofen 1.00 kg ai/ha reduced the weed population and growth particularly nut sedge which formed the major weed flora of the experimental plots where as post emergence application of chloroxuron 1.50 kg/ha was found more effective for checking the dicot weeds. The yield obtained in nitrofen treated plots was maximum amono all herbicides tested which was at par with two hand weedings and also it was most remunerative. The quality of bulb like T.S.S., sprouting and rotting was also not affected by application of nitrofen upto 140 days after harvesting.

INVESTIGATION ON CHEMICAL WEED CONTROL AND MULCH ON GROWTH, YIELD AND QUALITY CHARACTERISTICS OF ONION (Allium cepa L.)

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Among all the weed control treatments including hand weeded control (three phand weedings), application of Lasso E.C. @ 4.0 L/ha (preplant) + Stam F.34 @ 5.0 L/ha (postplant) after 40 days of transplanting proved to be the most effective herbicidal combination with minimum weed intensity at all the stages. It reduced fresh and dry weight of weeds, controlled weeds effectively with average highest weed control efficiency (76.3%) as against 72.16% under hand weeded control, which resulted to improved growth and yield parameters. The maximum number of leaves, the lowest bolting, maximum number of roots, maximum number of marketable bulbs, bigger size and maximum weight of bulbs with maximum yield of "A" grade bulbs were obtained under this treatment which ultimately gave the maximum average pyield of 488.69 q/ha, as against 476.08 q/ha under hand weeded control. This treatment gave 62.69% increase in marketable yield over unweeded control and 2.58% increase over hand weeded control.

COMPARATIVE EFFICIENCY OF HERBICIDES FOR WEED CONTROL IN ONION

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Onion being an irrigated closed space crop, it is seriously affected with weeds. Mechancial method of weeding is not feasible as it is close planted crop. Removal of weeds through had weeding is labourious, costly and time consuming. Acute labour shortage renders the hand weeding impossible. This situation creates a scope of using herbicides for effective and timely weed control in this crop.

The results showed that complete weed control was possible only by local method comprised of two hand weedings at 20 and 40 DAS. However, where there is paucity of labour, spraying of fluchiorain at 0.900 kg ai/ha as Pre planting nitrofen at 1.250 kg ai/ha as post emergence 15 days after transplanting dissolved in 600 litres of water was found most effective and economic for weed control in onion with minimum dry weed biomass (0.07 t/ha) and highest weed control efficiency of 96.43. This treatment yielded 37.56 t/ha mean bulb yield which was comparable with the yield recorded under local method (38.49 t/ha) giving maximum net return of Rs.10,681/ha.

FIELD EVALUATION OF DIFFERENT PRE-PLANT AND PRE-EMERGENCE HERBICIDES FOR WEED CONTROL IN ONION (Allium cepa L.)

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Eleven different herbicidal treatments comprising Fluchloralin, Methbenzthiazuron, Oxyfluorfen and Oxadiazon were tried singly and in combination with one hoeing at Vegetable Experimental farm, Punjab Agricultural University, Ludhiana for a period of three years during 1981-82, 1982-83, and 1983-84. These treatments were compared with unweeded (no hoeing) and weeded (weed free) controls. It was found that all the herbicidal treatments were proved selective for the onion crop and significantly reduced the weed population and dry weight accumulation of weeds and increased the bulb yield of onion as compared to the unweeded control. Amongst the herbicidal treatments oxadiazon at 1.25 kg ai/ha applied one week after transplanting the onion seedlings, Fluchloralin at 0.09 kg ai/ha + one hoeing after 45 days, Methabenzthizuron at 1.40 kg ai/ha (pre-emergence), Methabenzthiazuron at 1.40 kg ai/ha (Pre-emergence) + one hoeing after 45 days and Oxyfluorfen at 0.25 kg ai/ha (Pre-emergence) were proved statistically superior in controlling the different weed species.

EFFECT OF HERBICIDES WITH AND WITHOUT HAND WEEDING ON WEEDS AND YIELD OF ONION (Allium cepa L.)

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The crop of onion is closely transplanted. Most of the annual weeds grow and develop along with crop and cause severe Crop-weed competition particularly, during the early crop growth stages, as a result the bulb yield is reduced. Interculturing is not feasible. Thus use of herbicides for weed control is an essential requirement in onion.

An experiment was conducted with the herbicides Fluchloralian (2.0 kg ai/ha), Isoproturon (1.0 kg ai/ha) and Oxyfuorfen (0.250 kg ai/ha) in 1982-83. In 1983-84 Butachlor (1.0 kg ai/ha) was included by replacing Oxyflourfen found injurious to onion. All these herbicides were applied as pre-planting and pre-emergence applications. In addition to the treatments of Single application of herbicides all the herbicides were supplimented by one hand weeding for comparing the efficacy of herbicides for weed control. The hand weeding was carried out after 45 days in herbicide applied treatments. However, in case of hand weeding treatments, it was carried out 3 times (15,30 and 60 DATP). The results showed that pre-planting or pre-emergence application of herbicide followed by one hand weeding was at par with three hand weeding in reducing dry weight of weeds up to harvest. Fluchloralin increased bulb yield compared to other herbicides. Application of fluchloralin at 2.0 kg ai/ha as pre-emegent spray followed by one hand weeding found conducive to handweeding three times.

CHEMICAL WEED CONTROL IN TOMATO (Lycopersicum esculentum Mill.)

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Four herbicides namely fluchloralin, alachlor, nitrofen and metribuzin, each at two rates, were evaluated alongwith weed free condition (frequent hand weeding) and unweeded check for weed control in tomato crop during the 1980-81 to 1982-83 rabi season at Instructional Farm of Gujarat Agricultural University, Junagadh. All the herbicides at both the rates and weed free condition yielded significantly higher fruits of tomato over unweeded check. Among all the herbicides tried, metribuzin at both the rates (0.7 and 1.05 kg ai/ha) recorded the lowest (956 and 691 kg/ha, respectively) total dry weed biomass at harvest. Economic point of view, metribuzin 0.7 kg ai/ha recorded the highest net return of Rs.18,986/ha which was 13.1 and 69.0 per cent more over weed free condition and unweeded check, respectively.

EFFECT OF METRIBUZIN ON THE NUCLEIC ACIDS CONTENT OF TOMATO SEEDLINGS

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In this study effect of applicational rates of metribuzin (0.25m 0.50, 0.75, 1.00 and 1.25 kg/ha) on the nucleic acids synthesis of 20 days old tomato seedlings was examined. Results showed that synthesis of RNA and DNA was strongly affected by the rates of metribuzin. All the does exerted an inhibitory effect on RNA and DNA synthesis and this inhibitory effect was more evident with higher (1.00 and 1.25 kg/ha) rates. It was also noted that at lower doses, DNA synthesis was not very much inhibited as was RNA. However, at higher rates a reduction in DNA content similar to that of RNA was recorded.

Amaranthus polygamus, Flaveria australasica AND Parthenium hysterophurus L. CONTROL IN BRINJAL

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Field experiments were conducted in clayey soils of Tamil Nadu Agricultural University, Coimbatore in monsoon and winter seasons of 1984-85 with different herbicides and method application. Annual broad

leaved weeds **Amaranthus polygamus, Flaveria australasica** and **Parthenium hysterophorus L.** were the predominant weeds. Other weeds **Echinochlo colonum** (L) Link, **Dactylotenium aegyptium,** Richter and **Cynodon dactylon** (L) (Pers) in grasses, **Cyperus rotundus L.** in sedge and **Trianthema portulacastrum L., Amaranthus viridis L. Gynandropsis pentaphylla** and **Portulaca quadrifida L.** in broad leaved were also noticed in less intensity and frequency.

Selectivity of herbicides to brinjal was in the order of pendimethalin (1.0 kg/ha), fluchloralin (1.0 kg/ha), butachlor (1.5 kg/ha) and oxadizon (0.5 kg/ha). Oxyfluorfen (0.15 kg/ha) had least selectivity particularly for the pre-emergence application on 5th day after planting brinjal. But it was effective on all the annual grass and broad leaved weeds whereas pendimethalin and oxadiazon were not effective on **Flaveria australasica** and **Portulaca quadrifida.** Annual grass and broad leaved weeds **Trianthema portulacastrum** and **Amaranthus viridis** alone were effectively controlled by fluchloralin. It had higher weed control efficiency for the pre-emergence application then pre-plant incorporation. Butachlor was not effective particularly on broadleaved weeds. All the above herbicides were not effective on the perenial weeds.

EFFICACY OF VARIOUS HERBICIDES AND HAND WEEDING FOR WEED CONTROL AND FRUIT YIELD OF CHILLIES (Capsicum annuum)

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Field experiments were conducted at the Vegetable Research Farm, Haryana Agricultural University, Hisar during 1980-85 in Chillies Var. N.P. 46-A. Treatments were Fluchloralin (0.75, 1.00 & 1.25 kg/h), Pendimethalin (0.5, 1.0 & 1.5 kg/h), Oxyfluorfen (0.15, 0.20, 0.25 kg/h) Metribuzin (0.25 & 0.50 kg/h), Oxadiazone (0.5, 1.0 & 1.5 kg/h) and weed free, hand weedings (1, 2 & 3 H.W) and weedy check. Oxadizone, Pendimethalin and fluchloralin were found most effective weedicides to control weeds and they also increased the yield of chillies. Maximum vegetative growth and yield of chillies. Maximum vegetative growth and yield was found in Pendimethalin (1 kg/h) during 1980-81 and Oxadiazone (1 kg/h) during 1982-83 followed by weed free and fluchloralin 1.25 kg/h) as compared to weedy check and other treatments.

CHEMICAL WEED CONTROL IN GARLIC

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Garlic is an important condiment crop of Saurashtra region. Being a close spaced, irrigated crop, it is seriously affected with weeds. Mechanical of manual weeding is also difficult and costlier too. The tide over

these difficulties, control of weeds through herbicides is only remedial measure, therefore, present study was under taken at College Farm of Gujarat Agricultural University, Junagadh in rabi season of 1984. Seven herbicides were compared with weed free condition and unweeded check. Cultivar GAU-G-1 was sown at 15 × 7.5 cm distance.

Among the herbicides tried, oxadiazon 0.75 kg ai./ha, oxyfluorfen 0.240 kg ai./ha fluchloralin 0.9 kg ai./ha and methabenzthiazuron 1.4 kg ai./ha (all as pre emergence) recorded comparable bulb yield of garlic to weed free condition. Pre emergence application of oxadiazon produced the lowest dry weight of weeds (7.3 q/ha) and resulted in higher weed control efficiency (70.7 %). Bladex induced phytotoxic effect on the crop. Economics point of view, oxadiazon also found to be more remunerative among all the herbicides and both the checks.

ANNUAL GRASS AND BROAD LEAVED WEEDCONTROL IN TURMERIC

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Field experiment on turmeric (Var.) Co. 1 was conducted moderate fertile red gravely soils of Lower Bhavani Project, Bhavanisagar during 1983-84. Pre-emergence herbicides viz. fluchloralin (1.0 and 1.5 kg/ha), oxadizon (1.0 and 1.5 kg/ha),Oxyfluorfen (0.15 and 0.2 kg/ha) and pendimethalin (1.0 kg/ha) were compared with farmers practice of manual weeding twice on 25 and 40th day after planting and unweeded control.

Prominant weeds of the experimental fields were **Digitaria marginata** Link, **Echinochloa colonum L., Dactyloctenium aegyptium** Beauv, **Chloris barbata** SW, **Panicum repens, Dinebra retrolioa** and **cynodon dactylon** (L) Pers in grasses, **Cyperus routundus L** in sedges and **Boerhaavia diffusa (L), Amaranthus viridis** Linn., **Trianthema portulacastrum (L), Portulaca oleracea, Phyllanthus niruri L.** and **Euphorbia hirta L.** in broad leaved weeds.

All the above herbicides were effective on annual grasses and broadleaved weeds and not on sedges. Pre-emergence applicatin of Oxyflourfen (0.15 kh/ha) recorded the higher rhizome yield of 37900 kg/ha. It was followed by oxadiazon (1.0 kg/ha) fluchloralin (1.5 kg/ha) and pendimethalin (1.0 kg/ha). Unweeded control recorded the lowest yield of 17480 kg/ha. Application of herbicides had no residual effect of the succeeding crop groundnut. Integrated weed management of pre-emergence appliation of herbicide followed by one manual weeding is economic than farmers practice of two manual weedings.

EVALUATION OF HERBICIDES IN CORIANDER (Coriandrum sativum L.)

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Experimental results indicated that weed free condition and all the herbicides except oxyfluorefen significantly produced the higher grain yield over unweeded check, however pre emergence application of fluchloralin 0.900 kg ai./ha produced the highest grain yeild of 1185 kg/ha, closely followed by oxadiazon 0.750 kg ai./ha as pre emergence (1170 kg/ha) which was 52.9 and 51.0 per cent higher over unweeded check, respectively. Highest grain yield recorded under fluchloralin, pre emergence but it was failed to prove its superiality in economics and weed control efficiency. Oxadiazon recorded highest net return of Rs. 5073/ha and weed control efficiency (98.1 %). Thus oxadiazon 0.750 kg ai./ha as pre emergence found to be effective and economical for weed control in coriander.

CHEMICAL CONTROL OF WEEDS IN Colocasia esculenta

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Colocasia is an important vegetable crop and on account of the slow early crop-growth and canopy development rates, it is badly infested with weeds. Losses of 48.6% due to unchecked crop-weed competition was observed in the present investigation. Nitrofen, atrazine and simazine @ 1 kg ai/ha were statistically equally effective as those of two hand weedings in ridge planted colocasia crop. These were significantly superior to control. However, two hand weedings followed by additional earthing up in the later stage of crop growth was found to out-yield all the weed control treatments significantly as it prevented the underground rhizomes to bear leaves due to soil cover. Evidently it was concluded that additional late earthing up was essential along with early manual or chemical weed control for higher crop yields. This was however, not due to increased weed control effeciency but due to the more efficient management of crop-eco-system.

CHEMICAL WEED CONTROL IN GRAPE NURSERY

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Eight pre-plant and pre-emergence herbicides namely diuron, atrazine, alachlor, butachlor,

oxyfluorfen, fluchloralin, benthiocarb and oxadiazone at two concentrations were tested for effective weed control in grape var Anab-e-Shahi and **Thompson seedless** nurseries at the Indian Institute of Horticultural Research, Hessarghatta during the years 1983 and 1984. All the treatment significantly decreased the weed dry weight and weed population. Diuron and atrazine at 2.0 and 3.0 kg ai/ha and oxyfluorfen at 1.0 and 2.0 kg ai/ha proved to be the most effective and economical as it was not required to give hand weeding in the plots for 150 to 180 days. All the three chemicals controlled broad leaved weeds including **Parthenium** and grassy weed species such as **Cynodon, Cyperus** and **Elucine**.

Overall percentage of sprouting in October pruned cuttings was more than that of April pruned ones. These was a significant increase in the sprouting per cent of April pruned cuttings from treated plots except in atrazine treatment where the percentage was at per with control. None of the herbicides used produced any phytotoxic symptoms on the grape leaves. The seedling were very healthy and uniform.

SCREENING OF HERBICIDES FOR MANGO (Mangifera indica L.) SEED BED

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In a trial efficiency of 2,4-D sodium, 2,4-D dimethyl amine, 2,4-D ethyl ester each at 0.75 kg/ha and 1.5 kg/ha, simazin, triazin, metribuzin, diuron at 1.0 and 2.0 kg/ha, fluazifop-butyl at 0.125 kg and 0.25 kg/ha compared with hand weed and unweeded control. Herbicides were applied singly or incombination 7 days after sowing (DAS), Observations of 30 DAS revelaed that all treated plots were free from broad leaf weeds including hand weeded control. The total number weeds recorded were lowest in plots treated with 2,4-D sodium alone and in combination of 2,4-D sodium + metribuzin. On 45 DAS both thenumber and dry weight of weeds were lower in all treated plots as compared to unweeded control. But on 135 DAS there was no significant difference on dry weight of total weeds.

Number of seedlnigs/plot, plant height leaf number and fresh weight of mango seedlings were not affected significantly. However, difference in stem diameter under different treatments was significant. Higher seedling diameter was recorded in plots treated with 2,4-D sodium at 0.75 kg/ha and triazin 1.0 kg/ha, where as significant reduction in stem diameter was recorded in plots treated with 2,4-D sodium 1.5 kg/ha + fluazifop butly 0.25 kg/ha. Visual phytotoxic symptoms like leaf puccuring, curling and cupping was recorded in 2,4-D treatments, leaf burning in case of metribuzin at both rate.

WEED CONTROL IN CEREALS

MAIZE PRODUCTION WITH REDUCED TILLAGE AT DIFFERENT FERTILITY LEVELS WITH THE USE OF WEEDICIDES.

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The possibilities of maize production with reduced tillage under variable fertility levels with the use of herbicides in the Indo-Ganagetic alluvial soil of north Bihar were explored in three years of experimentation (1969-72) during both Kharif and Rabi maize growing seasons. The investigation examined three tilage systems (one soil inversion ploughing (TI). Ti + one desi ploughing, and the traditional system of four desi ploughing) : three fertility levels (80 : 40 : 40; 120 : 60 : 60 and 160 : 80 : 80kg/ha of N : P 205 : K 20 respectively) along with six weed management system (no weeding, pre-emergence application of simazine (Kiramine) @ 2 kg/ha, simazine (rabi) @ 2 kg/ha, one hand weeding, one H.W. + interculturing, weedicide + H.W. and weedicide + interculturing) in spilt-plot design of field layout with tillage fertility in the main plots and weed control treatments in the sub-plots having three replications.

The maximum quantities of biomass, macro-organic matter and organic carbon were recorded under reduced tillage, higher fertility ragime and weed-free conditions. These were accompanied by marked improvements in soil physical characteristics. The soil chemical fertility parameters also slightly better under the same management systems due to favourable trends in soil metabolism and biological phenomena. These changes were manifested in improved crop performances which were directly related with the physico-chemical fertility components. The ultimate result was that the crop gave significantly higher yields when grown with reduced tillage, higher plane of nutrition and chemical weeding. These were of considerable significance in minimising the structural deterioration of soil and keeping down production costs as compared with conventional tillage, lower fertilization rate and cultural methods of weed control in maize cultivation. Post-planting weeding and interculturing were of no benefit when the weeds were controlled chemically. It was concluded that more profitable maize production could be achieved with reduced tillage, proper fertilization and chemical weed control.

EFFECT OF FARM YARD MANURE, FERTILIZER AND HERBICIDE AT DIFFERENT LEVELS OF THEIR APPLICATION ON WEED CONTROL AND YIELD OF MAIZE

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Maize (Zea mays L.) is one of the staple food crops of Gujarat. The yield of kharif maize is low due

to uneven distribution of rain. In addition to this, farmers are not applying adequate manures and fertilizers. Thus, yield obtained is very low. Under such situation weed control is necessary at proper time. For good weed control use of atrazine is widely recoginsed in India and other countries as well.

An experiment with the herbicide treatments viz no application of Atrazine, 2.0 kg ai/ha of atrazine, 4.0 kg ai/ha of Atrazine and handweeding 3 times in combination with 0,10 and 20 T/ha FYM and 100N-50P as recommended while 50N-25P as half of the recommended dose of fertilizers under taken.

Pooled Analysis of three years (1982-83, 1983-84 and 1984-85) indicated significant effect of FYM, Fertilizer doses and atrazine on dry wight of weeds and yield attributing Charactars of Maize. Atrazine @ 2.0 kg ai/ha was found most effective and economical compared to Atrazine 4.0 kg ai/ha was found most effective and economical compared to Atrazine 4.0 kg ai/ha in all three years of the experiment. Hand weeding (3 times) was at par with atrazine 2.0 kg. The three years pooled analysis indicated that differences between two levels of fertilizer at 2.0 and 4.0 kg ai/ha atrazine application were Significant. The results indicated that at sub optimum (50-25-0) dose of fertilizer, atrazine application at 2.0 kg ai/ha found slightly injurious to plant and reduce yield.

EFFECT OF HERBICIDES ON THE PROTEIN CONTENT IN GRAIN OF WINTER MAIZE.

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The application of simazine as pre-emergence and atrazine as pre-emergence and post-emergence at 0.25, 0.5, 0.75 kg/ha increased protein content in maize grain. Simazine and atrazine recorded the highest protein content of 8.29 per cent and 8.14 per cent at 0.25 kg/ha compared with 7.26 per cent in case of control (three hand weeding).

The highest protein content of 8.46 per cent was, however, recorded in case of post-emergence treatment of atrazine at 0.5 and 0.25 kg/ha when applied 30 and 50 days after sowing, respectively.

HERBICIDAL CONTROL OF WEEDS IN PEARL MILLET FOR GRAIN

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A field experiment to study the effect of atrazine, simazine, linuron, terbutryn and cynazine (0.25 and 0.50 kg/ha) and pendimethalin and diniteramine (0.50 and 0.75 kg/ha) for weed control in pearl-millet for grain was conducted at the Punjab Agricultural University, Ludhiana for two years during kharif 1981 and

1982. All the herbicidal treatments caused significant reduction in dry matter accumulation by weeds as compared to no weeding and their efficacy was at par with two hand weeding.

In 1981 herbicidal treatments produced significantly higher grain yield as compared to no weeding and except atrazine 0.25 kg/ha and terbutryn 0.50 kg/ha these were at par with two hand weeding. During 1982, however, atrazine, terbutryn, cynazine (0.25 and 0.50 kg/ha) and simazine (0.25 kg/ha) yielded significantly higher than no weeding. Linuron, pendimethalin and dinitramine at the doses tested yielded though higher than two hand weeding but these differences were nonsignificant.

Atrazine, simazine and linuron (0.50 kg/ha) gave highest herbicide efficiency index idicating that these treatments resulted in effective weed control and caused higher grain yield of pearl millet.

EFFECT OF TIME OF WEED REMOVAL ON GROWTH AND YIELD OF PEARL MILLET

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Field experiments were carried out to study the effect of different weed free and weedy periods on the growth and yield of pearl millet and associated weeds during 1983 and 1984. **Trianthema portulacastrum** (Linn.) dominated the weed flora and contituted about 70 to 80 per cent of total weeds in weedy check.

Major flushes of weed emergence occured upto 40th day after crop sowing. Weed free maintenance for the initial 40 days or loger resulted in significantly lower weed population and dry matter production than weedy check plots at all the successive stages of crop growth. Plots kept free from weeds upto 40th day of crop sowing and beyond produced more pearl millet shoots dry matter plant-1, tillers plant-1, more and lengthy ears plant-1, greater weight of 1000 grains and hence much greater grain yield plant-1, and ha-1 than weedy plots. The critical period of weed competition was between 20 to 40 days after sowing. If the crop is kept weed free for the initial 40 days it escapes severe effects of weed competition.

COMPATIBILITY OF HERBICIDES WITH INSECTICIDE IN BAJRA

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A study was carried out in pearl millet in Tamil Nadu Agricultural University, Coimbatore during 1983-84 in split plot design. The main plot treatments, consisted of Farm yard manure (12.5 ton/ha), farm yard manure+carbofuran (12.5 ton + 2.5 kg ai/ha), carbofuran (2.5 kg ai/ha) and control. The sub-plot treatments were pre-emergence atrazine (0.25 and 0.5 kg ai/ha), isoproturon (0.25 and 0.5 kg ai/ha) and a weed free check.

The results revealed that application of farm yard manure - + carbofuran provided a better control of shoot fly and showed a good crop stand of bajra, followed by carbofuran alone. In sub-plot treatments atrazine at both the doses was selective and effective on grasses and broadleaved weeds. Isoproturon at lower dose was selective to bajra and effeftive on broad leaved weeds only.

In the interaction effect, farm yard manure + carbofuran and atrazine 0.5 kg ai/ha combination showed a better crop performance followed by carbofuran and atrazine 0.5 kg ai/ha combination.

EFFECT OF DIFFERENT TILLAGE PRACTICES AND WEED CONTROL MEASURES ON THE GROWTH, YIELD AND WEED FLORA IN BAJRA (Pennisetum americanum L.)

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Studies were carried out for three consecutive years (1970, 71 & 74) to find out suitable combination of tillage practices and weed control measures in Bajra. The soil of experimental site was sandy loam in texture, medium in fertility and alkline in nature with 8.3 pH. The treatments comprised of four tillage practices and four weed control measures. Different tillage practices had no significant effect on weed population, dry matter accmulation of crop,length of earhead, grain weight per earhed and grain yield. However, hand weeded plots gave maximum dry matter of crop at all the stages, longer earhed, higher grain wright per earhead and ultimately resulted into maximum grain yield (37.12 q/ha) which was significantly superior to other weed control treatments. Minimum weed population was recorded in hand weeded plots followed by 2,4-D Sodium salt 80% @ 1.00 ai/ha treated plots. Therefore, three hand weedings and any of the tillage practice studied may be considered as the best suitable combination for cultivation of Bajra crop.

INFLUENCE OF NITROGEN FERTILIZATION ON WEED GROWTH AND ON WEED CONTROL EFFICIENCY OF CERTAIN HERBICIDES IN SORGHUM CROP

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A field experiment was laid out in split-plot design with four levels of nitrogen (0, 30, 60 and 90 kg N/ha as main plot treatments and five weed control treatments (Atrazine @ 1.0 kg ai/ha, Cyanazine + atrazine @ 1 Kg kg ai/ha Cyanazine + atrazine 1.5 kg ai/ha, hand weeding twice at 15 and 30 DAS and no weeding) as sub-plot treatments at students Farm, Rajendranagar, Hyderabad during kharif, 1983 in sorghum (CSH-6). All the herbicides were applied pre-emergence.

A total of twenty two weed species belonging to twelve families were recorded in sorghum field of

which, **Trianthema monogyna, Cyperus rotundus, Panicum cruciforma, Lagasca mollis Physalis menema, Digera alternifolia** and **Acalypha indica** were the dominant weed species.

The number of weed species recorded did not differ with the level of nitrogen used but, the number per m^2 **Trianthema monogyna** increased, while that of **Cyperus rotundus** and **Panicum emeciforme** decreased with increase in level of nitrogen, at 15 and 30 days after sowing. The dry matter production of weeds increased by 84.46 per cent in 90 kg N/ha over 0 kg N/ha. The dry matter production of weeds increased over in herbicide treated plots with increase in the level of nitrogen. However, the weed control efficiency and weed index were not significantly influenced by the levels of nitrogen or by their interaction with weed control treatments.

STUDIES ON ECONOMISING NITROGENOUS FERTILISER THROUGH WEED CONTROL IN SORGHUM

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A field experiment was conducted at Students' Farm, Rajendranagar, Hyderabad during monsoon, 1983 in sorghum (CSH-6) with four levels of nitrogen as main plot treatments and five weed control treatments as sub-plot treatments in split-plot design and replicated thrice.

There was a significant increase in nitrogen uptake by weeds with each level nitrogen increase over 0 kg N/ha. The study revealed the possibility of saving 30 to 90 kg N/ha by adopting either chemical or manual weeding along (i.e. in the absence of N application), instead of applying 30, 60 90 kg N/ha each (in the absence of weed control). Hand weeding or atrazine in the absence of nitrogen application resulted in a net profit of Rs.1,336.92 and 801.30 respectively, which was higher than that realised from no weeding under 30, 60 or 90 kg N/ha (Rs.259.0, 633.0 and 624.0 respectively).

ECONOMICS OF THE COMBINATIONS OF CULTURAL AND CHEMICAL WEED MANAGEMENT PRACTICES IN WHEAT.

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In rabi 1981-82 and 1982-83, field investigations were carried on a moderately fertilesilty clay loam soil with twelve treatments viz. unweeded check, handweeding, hand hoeing, closer row spacing (15 cm), cross row sowing, isoproturon 1.0 kg ai/ha,applied 5 weeks after sowing (WAS), isoproturon 0.75 kg ai/ha applied 5 and 4 WAS, Isoproturon 0.5 kg ai/ha applied 3 and 2 WAS, closer row spacing and cross row sowing both in combination with isoporturon 0.5 kg ai/ha applied 2 WAS.

The data revealed that the grain yield due to closer row spacing and cross row sowing in

combination with isoproturon 0.5 kg ai/ha applied 2 weeks after sowing was significantly more than that obtained from other treatments, except isoproturon @ 1.0 and 0.75 kg ai/ha applied 5 WAS and isoproturon 0.75 kg ai/ha applied 4 WAS which were on par. Similarly, the gross and net returns per hectare as well as net return per rupee invested were highest from the closer row spacing in combination with isoproturon @ 0.5 kg ai/ha applied 2 WAS which was significantly more than unweeded check, hand weeding, hand hoeing, closer row spacing, cross row sowing, isoproturon 0.75 kg ai/ha applied 4 WAS, isoproturon 0.5 kg ai/ha applied either 2 or 3 WAS.

"NITROGEN ECONOMLY THROUGH WEED CONTROL IN WHEAT"

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Field experiments conducted at R.M.P. Agriculture college, Narsan (Saharanpur) for two consecutive years 1977 and 78 with increasing levels of nitrogen (0, 30, 60, 90 and 120 kg. N per hectare and five weed control treatments (weeded check, hand weeding, 2,4-D at ½ Kg. per hectare as post-emergence, Tribunil at the same rate of 1.4 kg a.e./ha as post emergence and tribunil as pre-emergence at the same rate in wheat have shown that nitrogen requirement may be reduced by 67% to produce the same yield of wheat if weeds are controlled by pre-emergence application of tribunil at the rate of 1.4 kg a.e. per hectare.

EFFECT OF SIMAZINE (2-CHLORO-4-6BIS (ETHYLAMINOI -S-TRIAZINE) ON THE YIELD AND PROTEN CONTENT OF WHEAT ON SOILS POLLUTED BY SEWAGE EFFLUENTS.

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A pot culture experiment was conducted in Varanasi on soils collected from cultivated fields irrigated by sewage water and adjacent fields not irrigated by sewage water, to study the effects of application of trace amount of simazine in soil on yield and content protein, phosphorus, lead, copper and zinc of radish. It was found that the influence of simazine on yield and protein and phosphorus content of crop was quite encouraging. The influence was more pronounced on soils polluted by sewage effluents. The results have clearly indicated that a trace amount of simazine applied in soils containing sewage residue is beneficial in improving the yield and quality of the crop. Further, this weedicide has no influence on the uptake to heavy metal pollutants like lead, copper and zinc.

INFLUENCE OF ISOPROTURON ON WEED MANAGEMENT IN WHEAT UNDER LOW AND OPTIMUM FERTILITY AND IRRIGATION

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JNKVV JABALPUR (M.P.)

To manage the weeds in wheat variety Lok 1, isoproturon @ 1.0 kg/ha Pre-emergence was compared with hand weeding at optimum fertility (120 : 60 : 40 NPK kg/ha 50% fertility (60 : 30 : 20 NPK kg/ha) and two levels of irrigations (5 and 2 irrigation) under two dates of sowing 29th November and 14th December). The weed control through isoproturon was proved at par to hand weeding under different crop management practices. The yield and yield attributing parameters although, varied non-significantly as compared to hand weeding but the values were higher in isoproturon treated plots under all management practices.

NUTRIENT UPTAKE BY WEEDS IN WHEAT AS INFLUENCED BY IRRIGATION, WEEDICIDES AND FERTILITY LEVELS

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Field experiment was conducted during rabi seasons of 1981-82 and 1982-83 at Agronomy Research Farm, Haryana Agricultural University, Hisar to study the nutrient uptake by weeds in wheat crops as influenced by three irrigation levels applied on the basis of physiological growth stages (CRI, F; CRI, T, F, M and CRI, T, J, F, M, D), Three weed control treatments (weedy check, Methabenzthiazuron at 1.5 kg /ha and Isoproturon at 1.0 kg/ha) and two fertility levels (60 kg N + 30 kg P_2O_5 and 120 kg N + 60 kg P_2O_5/ha). Four irrigation recorded significantly higher nitrogen uptake by weeds as compared to irrigation applied at CRI and flowering stages in 1981-82 and over six irrigations applied at all the critical stages of growth in 1982-83. Phosphorus uptake by weeds remain unaffected due to variation in irrigation number. Use of weedicides and recommended rate of fertilizers enhanced significantly the uptake of nitrogen and phosphorus over weedy check and half dose of fertility in both the years, respectively.

EFFICACY OF HERBICIDES AND THEIR ECONOMICS IN WHEAT.

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Field experiment on weed control in irrigated wheat involving four herbicides along (pre emergence) and incombinations with post emergence 2,4-D (sodium salt) and only 2,4-D were compared with local method (two hand weedings) and unweeded check at Main Wheat Research Station of Gujarat Agricultural University, Vijapur in rabi season of 1980-81 to 1982-83. Effective and economical weed control was only possible with spraying of 2,4-D 0.96 kg ai./ha as post emergence 30-35 days after sowing, which yielded 3520 kg /ha grain yield with highest net return of Rs.7,447/ha. Nitrofen + 2,4-D combination produced the highest grain yield but found less remunerative as compared to 2,4-D alone and local method.

WEED CONTROL EFFECTS IN RELATION TO METHODS OF SOWING OF WHEAT

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A field experiment was conducted during winter 1982 on a vertisoil at Udaipur to evalute the possible influence of cultural manipulation in wheat on the growth of associated weeds and crop yield. The trial comprised: (A) two row spacings (22.5 cm and 15.0 cm) and three planting patterns (parallen rows, criss-cross sowing, and skip row planting with one row skipped after every 90 cm sowing) in the Main plots and (B) four weeding treatments (Unweeded check, hand weeding 6 WSA., hand-weeding followed by hand pulling of grasses in 1st week of Feb., and isoproturon at 0.25 kg ha-12 WSA.) in the sub-plots a split-plot lay out. The major weeds in the experiment were **Phalaris minor, Avena fatua** and **Chenopodium** spp.

The field study showed that out of the cultural manipulation treatments tested, only skip-row planting technique improved the control of all kinds of weeds in (i) manual weeding 6 W.A.S. and (ii) isoproturon treatments. But this influence of skip-row planting on weeds in wheat was not found biologically strong enough to bring about any significant increase in the grain and straw yields of wheat over conventional method of planting of wheat in 22.5 cm parallel rows.

Thus, our study showed that weed control treatment efects in wheat were quite independent of changes in crop geometry and the two factors were not additive in any of the combinations tried. However, when the wheat crop was left unweeded, narrow row spacing of 15 cm gave significantly higher grain yield of wheat than the conventional row spacing of 22.5 cm.

EFFECT OF HERBICIDES ON THE UPTAKE OF NUTRIENTS BY WHEAT AND ASSOCIATED WEEDS.

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Field experiments were conducted in Haryana, India, to measure the effect of four herbicides (metexuron, isoproturon, pendimethalin and diclofop-methyl), hand hoe, weedy and weed free plots on the uptake of nutrients by wheat and associated weeds. The weeds when allowed to compete with the crop til crop harvest depleted 91.2, 19.4, 77.5; and 63.9, 13.4 and 54.6 kg N, P and K per hectare during 1979-80 and 1980-81, respectively. Control of weeds in wheat can avoid the drain of such a large amount of N, P and K through weeds and these nutrients can be utilized efficiently by the crop for its better growth and development ultimately aiding for higher grain yield.

EFFECT OF WEED CONTROL TREATMENTS ON UTILIZATION OF NUTRIENT ELEMENTS BY WHEAT IN ASSOCIATION WITH WEEDS

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Field studies carried out at Indian Agricultural Research Institute, New Delhi, indicated that a loss of 27.4 kg N, 3.1 kg p2o5 and 37.8 kg k2o/ha occurred on account of unchecked growth of weeds in wheat during 1980-81. The corresponding values, however, were 21.3 kg, 2.0 kg and 29.5 kg/ha during 1981-82. **Phalaris minor** shared major proportion in the total depletion of nutrients by weeds during both the years. All weed control treatments, significantly reduced the depletion of nutrients by weeds. Pre-emergence application of isoproturon at 1.2 kg ai/ha proved most effective in checking the nutrient drain by weeds, during both the years. Weed control treatments helped in increasing the nutrient uptake by the crop. Maximum of nitrogen (137.9 kg/ha) was observed under pre-emergence application of metoxuron at 1.6 kg ai/ha during 1980-81. Ths treatment icreased the uptake of phosphorus and potassium also by 75.2 and 30.8 per cent over that under weedy check. During 1981-82, however, post-emergence application of metoxuron at 1.6 kg ai/ha resulted in maximum uptake of nitrogen 144.9 kg/ha) which was 62.4 per cent hgher than that under weedy check. This treatment increased theuptake of phosphorus by the crop also by 43.1 per cent.

EFFECT OF SEED RATE AND PLANTING GEOMETRIES IN WHEAT ON WEED BIOMASS AND YIELD

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A field experiment was conducted during winter season of 1982-83 at Vivekananda Parvatiya Krishi

Anusandhan Shala, Almora, to assess the comparative effect of three planting geometries, namely, broadcast, line sowing (22.5 cm) and cross sowing (22.5 × 22.5 cm); on weed biomass production (dry weight of weeds at flowering stage of the crop) and wheat yield under recommended (100 kg/ha) and enhanced (150 kg/ha) seed rates. Crop was heavily infested by grass as well as broad leaved weeds. Predominant weed species present were; **Avena fatua L.**, **Phalaris minor** Retz., **Polygonum** spp. and **Stelaria media L.** No significant differences between two seed rates were observed with respect to weed biomass and yield. On the average; 1703 kg/ha dry wt. of weeds, 1596 kg/ha grain, 2522 kg/ha straw and Rs. 670/ha net returns with 100 kg seed and 1664 kg/ha weeds, 1584 kg/ha grain, 2383 kg/ha straw and Rs. 498/ha net returns with 150 kg seed; were recorded.Line sowing caused a significant (22.5%) reduction in weed biomass production resulting in significantly higher grain (1737 kg/ha) and straw (2810 kg/ha) yield s and a net return of Rs. 1,005/ha as compared to broadcast sowing which produced 2006 kg/ha weed biomass, 1204 kg/ha grain, 1727 kg/ha straw and a net loss of Rs.230/ha. Cross seeding showed a slight but not significant advantage over line sowing.

STUDIES ON THE EFFECT OF SEED QUALITY, LEVELS OF FERTILIZERS AND WEED CONTROL ON THE GROWTH AND YIELD OF LATE SOWN WHEAT

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An experiment was conducted in the Agronomy Research Area of the Department of Agronomy, H.A.U., Hisar to assess the performance of processed and unprocessed seed of late sown wheat cultivar WH-291, with varying levels of fertilizers under recomended practices of weed control, on the growth and yield of the crop. The varying levels of fertilizers were three i.e. i) recommended dose of nutrients ii) farmers practice and iii) control - no fertilizer. The weed control treatments were: i) Isoproturon @ 1 kg ai/ha, ii) 2,4-D ester @ 0.5 kg a.e./ha and iii) weed free and iv) weedy check i.e. control treatment for comparison. The experiment was conducted in split plot design with three replications. Processed seed provedbetter over unprocessed seed in respect of yield and yield attributes. The treatment-recomended dose of nutrients also gave significantly higher grain yield, number of grains per ear head, test weight, plant height and plant population per running meter row length, over the other two treatments. Regarding weed control treatments, weed free proved better than other treatments and it was closely followed by isoproturon and then by 2,4-D in respect of yield and yield attributing characters.

EFFECT OF WEED MANAGEMENT IN ENHACING FERTILIZER USE EFFICIENCY IN IRRIGATED WHEAT

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An experiment was conducted on irrigated wheat (Var. Sonalika) under recommended dose and 75

per cet of the recommended dose of NP in combination with nine weed, control treatments viz. benthiocarb 2.0 kg ai/ha (pre-emer.) 2,4-D sodium Salt 1.2 kg ai/ha (Post emer), combination of this two herbicides, benthiocarb 2.0 kg ai/ha + weedingat 30 DAS, only weeding at 15 DAS, at 30 DAS, at 15 + 30 DAS, at 15+30+45 DAS and unweeded control during rabi 1983-84 at College Farm, Gujarat Agricultural University, Navsari. The treatments were replicated three times in RBD. The results revealed that application of benthiocarb 2.0 kg ai/ha + 2,4-D 1.2 kg ai/ha (Pre+Post), hand weeding at 15+30+45 DAS and benthiocarb + hand weeding at 30 DAS checked the weed population as well as dry matter accumulation and given more than 75 percent weed control efficiency (79.2, 82.6 and 77.9 per cent respectively). These treatments produced 2816 kg. 2762 kg and 2647 kg/ha grain yield, respectively which were 41.2, 38.5 and 32.7 per cent hgher than control and 24.0, 21.6 and 16.6 per cent higher than one weeding at 15 DAS. weed dry weight was more under recommended dose of fertilizer than75 per cent dose. There was no significant difference in yield among these treatments indicating the possibility of reducing fertilizer dose when weed could be kept under check.

CHEMICAL AND CULTURAL WEED CONTROL IN DWARF WHEAT.

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To manage **Phalaris minor** Retz. and other associated weeds in dwarf wheat, herbicides viz; isoproturon1 kg/ha, metaxuron 1 kg/ha, terbutryn 0.75 kg/ha, each as pre ednergence and post emergence and cultural methods, viz; seed rates (25 and 50 percent higher than normal), sowing methods (broad cast and cross sowing), closer row planting (15 cm), hoeingonce (21 DAS) were tested against one hand weeding (21 DAS) and a weedy check.

The dominant weed flora consisted of **Phalaris minor** Retz. **Meliotus alba L., Chenopodium album L., Trifolium flagiferuma** and **Cynodon dactylon** Pers. Among the herbicides, effective weed control was noted in isoproturon 1 kg/ha pre-emergence followed by metaxuron and terbutryn pre emergence. All other post-emergence herbicides applications were less effective than the pre emergence. Terbutryn as post emergence proved phytotoxic and reduced the yield as compared to pre emergence herbicides. Among cultural practices the lowest weed biomass was found under cross sowing. The highest average grain yield was noted under pre emergence application of terbutryn (35.66 q/ha) followed by cross sowing (35.10 q/ha) and close rowspacing (34.91 q/ha.) These treatments were significantly superior as compared to control (24.44 q/ha) and at par to one hand weeding (34.12 q/ha). The yield of other herbicides were at par whether used as pre or post emergence.

TIME OF METOXURON APPLICATION FOR WEED CONTROL IN WHEAT (Triticum aestivum L.) IN RELATION TO SOIL MOISTURE AND DOSE OF NITROGEN APPLICATION AT SOWING.

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A field experiment was conducted at the Punjab Agricultural University, Ludhiana during rabi 1980-81 and 1981-82 to study the time of mextoxuron application in relation to soil moisture and proportion of nitrogen applied at sowing for weed control in wheat. Treatments comprising of two levels of soil moisture (Top 0-4 cm soil layer dry, Top 0-4 soil layer normal) and three levels of nitrogen at sowing (full at sowing, 2/3 at sowing × 1/3 top dressed with first irrigation 1/2 at sowing × 1/2 top dressed with first irrigation) in the main plots and six weed control treatments (metoxuron 1.5 kg/ha pre-emergence, metoxuron 1.5 kg/ha post-emergence before and after timely first irrigation 3 to 4 weeks after sowing, metoxuron 1.5 kg/ha post-emergence before and after delayed first irrigation 6 to 7 weeks after sowing, one hand weeding and no weeding) in the subjects were replicated three times. Dry top soil layer reduced population and dry matter accumulation by weeds. Full or 2/3rd nitrogen at sowing reduced weed population and dry weight of weeds at harvest. However, grain yield did not vary significantly due to variable top soil moisture and quantity of nitrogen application at sowing. Metoxuron application gave an effective control of both grassy and broadleaf weeds and was better than hand weeding. Mextoxuron pre and post-emergence before and after first irrigation yielded practically the same. Bio-efficacy of metoxuron pre-emergence treatment was comparatively inferior in 1980-81 than in 1981-82. Mextoxuron application before and after timely first irrigation affected weed free conditions. Mextoxuron applied before delayed first irrigation proved phytotoxic and caused significant reduction in grain yield. Metoxuron applied after delayed first irrigation gave poor control of weeds and less grain yield.

INFLUENCE OF HERBICIDES ON WEEDS AND ON GROWTH YIELD AND QUALITY OF WHEAT

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The effects of eight herbicides viz Nitrofen, 1.25 kg/ha, Dichlormate, 2.25 kg/ha, chloroxuron 2.40 kg/ha, Bentazon 2.40 kg/ha, Diuron, 0.5 kg/ha, 2,4-D Na 1.0 kg/ha, all as pre-emergence, 2,4-D Amine, 0.5 kg/ha, 2,4-D Ester, 0.5 kg/ha, as post-emergence, weedy check, one Hand weeding and three hand weeding treatments were tested on weed on weed control, growth, yield and quality of wheat, var HD1925 at JNKVV, Jabalpur. The combined influence of Dichlormate 1.35 kg/ha, pre em.×2,4-DNA, 0.5 kg/ha. Post em. 2,4-DNA 0.5 kg/ha. Post em. 2,4-DNA 0.5 kg/ha, pre em. × 2,4-DNA 0.5 kg/ha, post em. and Nitrofen 0.75kg/ha, ×one hand weeding was also tested. The dominent weeds of the experimental area were

Eclipta alba Oldenlendia aspera, Chenopodium album, Sonchus arvense, Vicia sativa, Cynodon dactylon, Portulaca quadrifeda, Convolvalus arvensis, Melilotus alba, and **solanum nigrum.**

All the herbicidal treatments reduced the weed population and weed biomass significantly as compared to weedy check. Amongest herbicidal treatments, 2,4-D Ester was most effective followed by 2,4-DNA pre em. The weed dry weight was lower in Bentazon pre emergence 2.40 kg/ha, 2,4-D Amine 0.5 kg/ha, and 2,4-D Ester as post emergence. These treatments did not effect the plant height, effective tillers, leaf area, ear length, spikelets. No. of grains per ear, Nitrogen uptake by crop and protein percentage significantly, although the values of these characters were lower under weedy check. The dry weight per plant, grain and straw yield was significantly greater in almost in all the treatments as compared to weedy check but at par to one hand weeding, as well as three hand weeding. Amongest herbicidal treatments along, grain yield was maximum under Dichlormate followed by Chloroxuron, Bentazon and 2,4-D Ester (52. 49, 52.24, 51.42 and 50.60 q/ha) respectively.

GROWTH AND YIELD OF WHEAT AND ITS ASSOCIATED WEEDS IN RELATION TO DIFFERENT DATES OF SOWING

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Different in growth and yield of **Phalaris minor, Avena ludoviciana, Chenopodium album, Lathyrus aphaca** and **Triticum aestivum** were measured under different dates of sowing during 1982 and 1983 at Haryana Agricultural University, Hisar. The dates of sowing during 1982 were Oct. 24, Nov. 10, Nov. 25 and Dec. 10 and during 1983 these were Oct. 25, Nov. 5, Nov. 15, Nov. 25, Dec. 5, Dec. 15, Dec. 25, Jan. 5 and Jan. 15.

Leaf area and number of leaves per plant **Phalaris minor** were higher upto Nov. 10, 1982 and upto Nov 25 during 1983. The dry matter accmulation in **Avena ludoviciana** did not decrease significantly upto Nov. 25 in both the years. Initially wheat grew more rapidly than **Phalaris minor** and **Avena ludoviciana** but when they reached 5-6 leaf stage the growth of these weeds exceeded that of wheat. The dry weight of Chenopodium album reduced by 50 per cent when the sowing was done beyond 10th and 15th Nov. Maximum dry weight in **Chenopodium album** and **Lathyrus aphaca** was recorded in Oct. 25 sowing. **Lathyrus aphaca** could withstand late sowing upto 15 Jan. but **Chenpodium album** did not produce any seed when it was sown on 25th Dec. or late. The 1000 grain weight of all weeds increased with corresponding delay in sowing.

INTERACTION OF WEED MANAGEMENT PRACTICES WITH OTHER CROP PRODUCTION TECHNOLOGY UNDER RESOURCE CONSTRAINS IN WHEAT

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A field experiment was conducted on clayey soils of Agricultural college farm Navsari during Rabi 1982-83 and 1983-84 on wheat sonalika in strip plot design with four replications, with a view to find out the suitable package of practices alongwith weed management practices for rationalization of inputs usage for higher returns. In all 16 treatment combinations consisted of 2 levels of weed management (W1 = Basalin @ 1.25 kg ai/ha, W2 = Hand weeding at 40 D.A.S.), 2 levels of irrigation (I1 = 5 irrigations, I2 = 4 irrigations), 2 levels of sowing time (D1 = Normal D2 = Late sowing) and 2 levels of fertility (F1 = 120-60-60 NPK kg/ha, F2 = 60-30-30 NPK kg/ha) were tried.

The results of pooled analysis revealed that both the weed management practices (Basalin @ 1.25 kg ai/ha and one hand weeding at 40 days after sowing) found equally good to control the weeds in wheat crop.

As regards irrigation treatments, higher number of irrigation (5) had produced significantly higher grain yield of wheat during both the years of study as well as in pooled analysis.

The normal date of sowing was found significantly superior over delayed sowing during both the years of study as well as in pooled analysis.

Among the fertility levels tried, higher level of fertilizer (120-60-60 kg NPK/ha) found to be significantly superior during both the year of investigation.

As regards to interaction effects, significantly higher grain yields of wheat were recorded under the treatment of higher numbers of irrigation (5) with both the treatments of weed management during both the years of study.

The normal date of sowing with higher fertility level had produced significantly higher grain yield than rest of treatment combinations in pooled analysis

INFLUENCE OF SURFACTANT ON THE EFFICIENCY OF VARIOUS HERBICIDES APPLIED IN WHEAT

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Field experiments were conducted to determine the influence of selvet (0.1%) on the efficiency of isoproturon, metoxuron and methabenzthiazuron applied in wheat during 1982 and 1983. Post-emergence application of these herbicides at 25% reduced rates were compared with normal rates of these herbicides applied as post-emerence and as pre-emergence and in combination with 2,4-D as post-emergence.

Addition of surfactant with isoproturon and metoxuron increased the percent control of all the weeds when compared with their application as pre-emergence. The percent control of some broad leaf weeds like **Lathyrus aphaca, Vicia sativa** and **Melilotus indica** increased with the addition of surfactant as compared to when these herbicides were applied as post-emergence and pre-emergence at normal rates. The efficiency of methabenzthiazuron both with and without surfactant was less than that of isoproturon and metoxuron. Isoproturon and metoxuron at normal rates and with surfactant at reduced rates significantly increased the grain yield of wheat when they were applied as post-emergence.

EFFECT OF ISOPROTURON AT DIFFERENT STAGES OF WHEAT AND ASSOCIATED WEEDS

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Isoproturon was applied at 0.5, 1.0 and 1.5 kg/ha at 2,4-D and 6 leaf stages of wheat, Phalaris minor, **Avena ludoviciana** and **Vicia sativa.** The observations were recorded 5,10 and 15 days after the herbicide application. The reduction in dry matter production with isoproturon was maximum at 2-leaf stage. **Phalaris minor** and **Avena ludoviciana** revealed a reduction in dry matter when compared to wheat and **Vicia sativa.** Isoproturon did not exhibit any significant influence on the growth of **Avena ludoviciana** when applied at 6 leaf stage.

In general, isoproturon application resulted in an increase in peroxidase activity at all the leaf stages in all the plant species. Chlorophyll content, total sugars and reducing sugars decreased while total protein content increased after isoproturon application at 2,4 and 6 leaf stages in wheat and the associated weeds. The effect on peroxidase activity, chlorophyll content and sugar content was maximum on **Phalaris minor.** The decrease in total soluble sugars was more at the 4-leaf stages.

EFFECT OF DATES OF SOWING OF WHEAT ON PHALARIS MINOR AND WHEAT YIELD

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PANTNAGAR (NAINITAL)-263 145

Experiment was conducted during winter seasons from 1981-82 to 1982-83 to evalute whether density and growth of P. **minor** would be reduced due to the delayed planting of wheat. Density of P. **minor** plants at 60 days after sowing, P. **minor** heads at harvest and dry weight were less when planting was delayed. These effects were more pronounced due to planting of wheat in late December. Late planting caused significant reduction in the grain yield of wheat. Per cent loss to grain yield due to weeds was much higher during early plantings as compared to delayed plantings. Grain yield was drastically reduced in late plantings.

Observations revealed that though there might be reduction in the density and growth of P. **minor** due to delayed sowing and killing weeds prior to sowing but at the cost of grain yield of wheat. The reduced weed population due to delayed planting would not compensate the loss in grain yield.

TRIANTHEMA PORTULACASTRUM L. CONTROL IN WHEAT

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Field trial was conducted in clayey soils of TNAU, Coimbatore during 1984-85. Pre-emergence application of herbicides viz., isoproturon (0.25 and 0.5 kg/ha), methabenz-thiozuron (1.0 and 1.5 kg/ha), pendimethalin (0.6 and 0.8 kg/ha and post-emergence herbicides viz., 2,4-D (1.0 kg/ha) in ethyl ester, amine salt and sodium salt forms and DOWCO 433 (Starame) (0.2 and 0.4 kg/ha) were compared against manual weeding and unweeded control.

Major weed of the experimental field was **Trianthema portulacastrum L.** and others **Echinochloa colonum (L.)** Link, **Dactyloctenium aegyptium (L)** in grass, **Cyperus rotundus L.** in sedge and **Digera arvensis** Frostk, **Parthenium hysterophorus L., Daturaip** and **Convolvulus arvensis** in broadleaved weeds are also noticed in lesser intensity and frequency.

In pre-emergence application isoproturon and methabenzthiozuron were selective to wheat (var. HD 2189.)Higher dose of isoproturon and methabenzthiozuron was effective in controlling the major and other annual broad leaved and grass weeds. Post-emergence application of 2,4-D in ethyl ester, amine salt and sodium salt and DOWCO 433 in both doses were effective in controlling the annual and perennial broadleaved weeds.

INFLUENCE OF HERBICIDE AND HAND WEEDING IN COMBINATION WITH FERTILIZERS (MACRO AND MICRONUTRIENTS) ON GROWTH YIELD AND QUALITY OF WHEAT (VARIETY J-24).

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Wheat cultivation in India is concentrated in the States of Punjab, Haryana and Madhya Pradesh. Reduction in grain yield of wheat due to weeds have been reported by many Scientists Govinda Singh et.al. 1982, Tosh B. Mishra (1977), Gill & Brar (1975). Weeds are becoming a serious problem in reducing yields as well as it creates a problem of mixture in grain seeds also. In present study the main aim was to study the optimum ratio of nitrogen and micronutrient (DMS) in combination with wheat herbicide (Isoproturon) and hand weeding.

Application of the correct fertilizers both macro and micronutrients in appropriate quantities and at right times combined with suitable weed control pays a key role in successful cultivation of many crops.

The trial conducted at Samaldevi Agricultural Research Farm, at Kalol (Dist Panchmahals), Gujarat, India, concluded that application of nitrogen + herbicide + micronutrient (80 + 1.25 kg ai + 12.5 kg/ha) gave better c

growth, more yields and quality produce and better weed control in wheat J-24 during the Rabi seasons of 1982 and 1983.

Optimum use of nitrogen fertilizers balanced with chelated micronutrient called Devimicroshakti (DMS) by soil or by foliar application and combined with pre-emergence spray of herbicide (Isoproturon) given the extra returns of Rs.470 to Rs.550 per hectare and also helps in soil conditioning and improvement of depleted soils with micronutrients.

EFFECT OF VARIABLE TILLAGE AND WEED CONTROL METHODS ON THE GROWTH, YIELD AND WEED INTENSITY IN WHEAT

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The studies were conducted at the Research Farm of Haryana Agricultural University, Hisar, Haryana, during the Rabi season for three consecutive years (1970 and 1974). The soil of experimental field was sandy loam in texture, alkaline in reaction and medium in fertility. Four tillage practices alongwith different methods of weed control were tested. The results revealed that variable tillage practices had no significant effect on tillering, plant height, grain yield and weed intensity in wheat. Among the weed control treatments, the highest grain yield (56.37 q/ha) was recorded with for hand weedings which was statistically at par with 2,4-D application @ 1.00 kg a.e./ha. (Sodium Salt 80%) Hence, reduced tillage with hand weedings and/or 2,4-D application was found to be the best combination for harvesting more profitable wheat crop.

ECONOMICS OF WEED CONTROL IN FIELD CROPS AT TAMIL NADU

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Weed survey conducted in different regions of Tamil Nadu revealed that the labour requirement was highest in direct-sown-rice and onion ranging to 75 man days per weeding per hectare. For various other crops the requirement was only half of this. It is also learnt from the survey that the labour wage is Rs.5/= per day in dry areas and during non-season in other locations. During the peak-season and in urban areas, sudden rise in the wage to Rs.10/per day is seen.

Chemical weed control and other integrated weed management practices appeared to be cheaper compared to present farmers practice. Results of the various experiments conducted at Tamil Nadu Agricultural University, Coimbatore supported this.

Chemical control with butachlor or thiobencarb or 2,4-D was cheaper in upland rice. Use of pre-

emergence herbicides in combination with 2,4-D followed by one hand weeding costed less as compared to the farmers practice in case of transplanted rice. The net returns was also more, per rupee invested. Weeding cost in cotton with fluchloralin was Rs.558/ha as against Rs.738/ha with manual weeding. Pre sowing application of fluchloralin to groundnut plus use of star weeder has brought down the weeding costs from Rs.630/ha to Rs.584/ha. Substantial yield increase was also observed with this practice. Pre-emergence application of atrazine in millets like sorghum, corn, bajra and also in sugarcane was found cheaper.

Non-availability of labour for timely weeding. Particularly near Industrial areas, cultivation of commercially important crops like turmeric, onoin, difficulty in manual weeding under certain field conditions coupled with the increased labour cost, suggest the use of economically viable weed control practices.

EFFECT OF TERBUTRYN ON WHEAT

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Anand Campus, ANAND.

Field experiment was conducted at Jobner in 1977-78 to find out suitable method, time dose of Terbutryn 2-(terbutylamino)—4-(ethylamino)-6-(Methylthio)-5-(trazine) for control of **(Phalaris minor)** wild canary grass and other weeds in dwarf wheat.

Application of terbutryn at 1.0 kg/ha as pre-emergence marked by reduced the population of **P. Minor, C. Album P. oleracea, R. dentalus** and **Trifolium** spp. than other treatments. Effect of terbutryn at 0.75 and 1.0 kg/ha as pre-emergence did not show any adverse effect on germination and growth of wheat but post emergence appliation of terbutryn either at 0.75 or 1.0 kg/ha showed phytotoxic effect on crop. The crop responded more yield with terbutryn at 1.0 kg/ha as pre-emergence than at 0.75 kg/ha. Thus applicatin of terbutryn at 1.0 kg/ha as pre-emergence proved best in respect of yield and reduction of weeds in wheat.

TESTING POST-EMERGENCE HERBICIDES IN WHEAT

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Field experiment was conducted at Jobner in 1977-78 to evaluate the efficacy of metoxuron, isoproturo, method benzthiazuro and nitrofent 2.4D (No salt) on weed control and their effects on wheat. All herbicides were applied as post-emergence spray 40 days after sowing. Herbicides effects were compared with one hand weeding at 5th week and weedy check.

Maximum weed control efficiency was obtained with metoxuron followed by isoproturon, nitrofen + 2,4-D and Methabenzthiazuron. Hand weeding was next to Metoxuron. The yield of wheat was significantly reduced due to appliation of nitrofen than weedy check and other treatments.

SOIL RESIDUES, SOIL MICROFLORA, PHYSIOLOGY AND ALLELOPATHIC EFFECT

ALLELOPATHIC POTENTIAL OF GREEN FOLIAGE OF SOME PERENNIAL SPECIES ON CYNODON DACTYLON (L.) PERS.

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DHARWAD.

Green foliage of species viz, **Parthenium, eucalyptus, Casuarina, Pithecellobium, acacia** and paddy straw was spread on the land heavily infested with **Cynodon** to study the relative allelopathic potential. Based on the shoot number, dry weight of foliage and rhizomes of **Cynodon,** the control efficacies were worked out. Spreading green foliage of **Pithecellobium** ranked first by exhibiting higher allelopathic potential for longer period followed by that with **Eucalyptus** and **Casuarina** which ranked second and third respectively. The allelopathic potential of **Parthenium, acacia** and paddy straw was short lived and decreased with time lag.

ALLELOPATHIC POTENTIAL OF PARTHENIUM (PARTHENIUM HYSTEROPHORUS L) EXTRACTS

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An invitro survey was conducted to determine the allelpathic potential of Parthenium, a noxious weed. Parthenium extracts were prepared using various solvents, water extracts and inhibitory activity was bioassayed by measuring sorghum, pearlmillet, blackgram, greengram, sunflower and Red gram seeds germination. Inhibitory activity found mainly in ethanol and water soluble extracts of Parthenium. The impact of the water extract was not due to osmotic effects as shown by osmolarity measurements or total cation concentration. When the chloroform extracts of shoot was purified by column chromatography inhibition was associated with fractions containing seoquiterpene lactones and several phenolics. Inhibitor levels were lower in Parthenium roots than in leaves.

Bioassay of the petroleum ether, chloroform and ethylacelate were revealed the presence of seed germination and seeding growth inhibitors in nearly all fractions with very pronounced inhibition by chloroform and water extracts. The latter inhibited seedling growth by 87 and 75 percent respectively, when the fractions were bioassayed at a level equivalent to 4 g fresh plant material per petridish. Bioassay of

the aqueous and chloroform fractions indicated germination at a level equivalent to 2.g of fresh weight per petridish. Germination was not affected by petroleum ether extracts. Inhibition of germination was detected with ethylacetate extracts at 8 g fresh weight per petridish.

ALLELOPATHIC POTENTIALITY OF EUPATORIUM ADENOPHORUM SPRENG

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KIRTIPUR, KATHMANDU, NEPAL.

Eupatorium adenophorum is the most noxious weed in midland Nepal. This species is so prolific that indiginous Himalayan species might be crowded out by this weed. Allelopathic study was conducted and it was found that all three parts inhibit the seed germination and growth of **Eupatorium,** maize and **Amaranthus caudatus,** Extraets in ethanol and methanol attributed maximum inhibition of crop (maize) and weed. Leaves possess more elements (K, Mg, Fe, Mn, N, etc) than root and stem. Soil under the canopy of this weed had comparatively less Mg, Fe, and Mn than weed free soil.

STUDIES ON ANALYSIS OF ROOT EXUDATES OF SORGHUM AND OSMOTIC POTENTIAL OF SORGHUM AND STRIGA

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The root exudates of nine sorghum cultivars including both susceptible and tolerant to Striga were analysed quantitatively for total sugars and soluble aminoacids under laboratory conditions at Dharwad during 1980. Sorghum genotypes which were tolerant to Striga infestation recorded higher quantities of total sugars and soluble amino acids as compared to Striga susceptible genotypes.

The osmotic potential of sorghum (leaf and root) and Striga (lead and root) from the samples collected at flowering stage at Dharwad during 1980 was estimated by making use of electrical conductivity of leaf and root extracts. The osmotic potential was higher in both leaf and root of Striga than the leaf and root of sorghum.

STUDIES ON CROP TOLERANCE TO ALACHLOR FOR SELECTION OF BIOASSAY AND COMPANION CROPS

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Indian Institute of Horticultural Research,
BANGALORE

Peas detected alachlor residues upto 0.00001 ppm in solution culture and black gram upto 0.001 ppm

in soil culture measured in terms of reduced root length within a period of seven days under controlled conditions. Black gram, french beans, peas, okra and maize were tolerant to alachlor at 2.0 kg a.i/ha, the highest concentration tested under field conditions. alachlor treated at the rate of 1.5 and 2.0 kg ai/ha persisted for 30 days under sandy loam soils(organic matter 0.6%) as measured by the seedling survival per cent of the fenugreek bioassay.

DISSIPATION OF ATRAZINE IN SOIL

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A field experiment with sorghum var. Co.24 was conducted is Eastern Block, TNAU farm during Rabi, 1984. The soil is black clay loam having a pH of 8.2 and EC 1.3 m.mhos/cm. Pre-emergence atrazine was applied to sorghum at levels 0.0, 0.25, 0.375, 0.5 abd 1.0 kg/ha on 3rd day after sowing. Soil samples were drawn periodically and were analysed for atrazine content. Increasing levels of atrazine application showed significant increase in atrazine content of soil at all the stages. The atrazine content in the soil reduced as the days after atrazine application increased. The atrazine content in 90th day soil samples were also estimated by conducting cucumber growth bioassays and found that the results were closely correlated spectro photometric estimations.

STUDIES ON RESIDUES OF HERBICIDES APPLIED IN COTTON (GOSSIPIUM HIRSUTUM) VAR.MCU.9 BY BIO—ASSAY TECHNIQUES

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Pot culture experiment was conducted with post harvest soil samples from the weed control experiment on cotton. The soil is clayey with a pH of 8.4 and E.C. 1.8 m. mhos/cm. The treatments were fluchloralin (1.0 kg/ha), oxadiazon (0.5, 1.0 and 1.5 kg/ha), oxyfluorfen (0.1, 0.15 and 0.20 kg/ha) and pendimethalin (1.25 kg/ha) cucumber was found to be sensitive to these herbicide residues while finger millet, foxtail milet and mung were not sensitive. Another pot culture experiment with known concentrations of the above herbicides was also conducted. Regression coeffcients and quadratic equations were worked out for germination percentage, plant height and drymatter production of cucumber. Quadratic function particularly with respect to plant height of cucumber showed consistant data on herbicide residues. Oxyfluorfen recorded higher residue levels in post harvest soil followed by oxadiazon and pendimethalin.

ULTRA STRUCTURAL CHANGES OF ROOT SURFACE OF MUNGBEAN (VIGNA RADIATA L.) SEEDLINGS INDUCED BY DINITROANILINES

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Banaras Hindu University VARANASI-221 005.

Ultra structure study of the root surface region of four days old mungbean seedlings grown in 1 ppm solution of fluchloralin and pendimethalin was conducted. Results showed that both the herbicides exerted a marked inhibitory effect on root hair growth. Studies further confirmed that the root growth inhibition was a characteristic of these herbicides.

EFFECT OF ATRAZINE APPLICATION ON YIELD OF SORGHUM AND FINGER MILLET AND ITS REDIDUAL PERSISTANCE IN THE PRODUCE

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A field experiment was conducted with sorghum var. Co. 24 followed by finger millet var. Co. 11 in black soils of TNAU farm, Coimbatore. Pre-emergence atrazine was applied to sorghum on third day after sowing at levels 0, 0.25, 0.375, 0.5 and 1.0 kg/ha. The grain and straw yields remain unaffected due to higher levels of atrazine application in sorghum as well in the residual crop finger millet. Estimation of atrazine residue in grain and straw of sorghum and finger millet through spectrophotometric method revealed that at higher levels of atrazine application (at 0.5 and 1.0 kg/ha) the residues were dectable however the quantities of residues detected were far below the tolerance levels.

ATRAZINE RESIDUE STUDIES IN GRAIN SORGHUM (CSH-1) AND SOIL

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A field experiment was conducted during Kharif season of 1984 at Sorghum Research Station, M.A.U. Parbhani on medium black soil to find out the residue toxicity and atrazine in the grain of sorghum at harvest stage and to find out the presistance level of atrazine in soil at different days interval. The experiments was frame in randomised black design with 4 treatments, viz- Control (water spray); atrazine (50% WP) and pre-emergence @ 0.25; 0.50 and @ 1.00 kg ai/ha. Numerical increase in grain yield of sorghum was observed at 1.00 kg ai/ha than 0.25 and 0.50 kg ai/ha. Similar trend was noticed in fodder yield also. In regard to residue of atrazine there was higher concertnation of residue of atrazine at 5th day after sowing and later on there was decrease in persistance level. It was also observed that the residue of atrazine in sorghum grain was 0.098 ppm and which is below the safer limit (0.25 ppm).

RESIDUAL EFFECT OF ATRAZINE AND ISOPROTURON IN MILLET - PULSES ROTATION

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Field experiments were conducted in clay loam soilds with pH 7.6 at Tamil Nadu Agricultural University, Coimbatore during 1983-84. Pre-emergence herbicides namely atrazine (0.25 and 0.5 kg/ha) and isoproturon (0.25 and 0.5 kg/ha) were applied to pearl millet and their residual effect was studied in pulses (Greengram - Co.4 and Cowpea Co.4) with and without fluchloralin (0.75 kg/ha)

Pre-emergence application of atrazine at 0.25 kg/ha and isoproturon at both doses did not show any residual toxicity to the succeeding pulses, where-as higher dose of atrazine (0.5 kg/ha) had residual effect on greengram and cowpea. Atrazine (0.5 kg/ha) followed by fluchloralin and more residual effect. Among the pulses greengram was more resistant than cowpea to the herbicides applied to the previous crop of bajra.

EFFECT OF GRADED DOES F.Y.M., FERTILIZERS AND ATRAZINE ON MAIZE YILED AND SOIL MICROBIAL POPULATION

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Application of graded dose of F.Y.M., fertilizers and atrazine prior to maize sowing have tremendous effect on maize fodder and grain yield. Microbial population of soil was estimated and recorded at monthly intervals after sowing. Application of graded dose of F.Y.M., fertilizers and atrazine initially reduced the microbial population but was observed to be develop fast during crop growth in sandy loam soil of Gujarat.

EFFECT OF TERBUTRYN, METHABENZTHIAZURON AND PENDIMETHALIN ON SCIL MICROFLORA IN BENGAL GRAM (CICER ARIETINUM L.) AND LENTIL (LENS CULINARIA MEDIC.)

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Field studies were consucted at Punjab Agricultural University, Ludhiana to find out the effect of terbutryn, methabenzthiazuron and pendimethalin on soil microbial activities ingram and lentil. Laboratory studies involving the measurement of amout of Co2 evolved and an index of microbial activity under the influence of different concentrations of all the three herbicides, were also undertaken. The soil of the experimental field was loamy sand and slightly alkaline (pH 8.4) in reaction. None of the herbicides had any significant effect on the total count of fungi, bacteria and actinomycetes, estimated at different intervals after spray of the herbicides in gram field. However, in lentil field, at three days after spraying, methabenzthiazuron at 1.5 kg/ha reduced the actinomycetes population significantly as compared with

untreated check treatment. After five days of spray, methabenzthiazuron at 1.8 kg/ha stimulated the bacterial population significantly over terbutryn and pendimethalin whereas pendimethalin at 1.0 and 1.5 kg/ha significantly reduced the bacterial population as compared with untreated check treatment. At later stages of estimation, bacterial, fungal and actionmycetes population was not affected by any of the herbicides. All the herbicides had only a transient effect on the miorobial respiration. Terbutryn and pendimethalin showed stimulatory effect upto a concentration of 5 ppm, whereas methabenzthiazuron was stimulatory upto a concentratin of 10 ppm. The Co_2 evolution trend indicated that if the concentrations exceed 100 ppm, the chemicals might result in detrimental effect in disturbing the microbial balance of the soil.

STUDIES ON THE EFFECT OF SOME COMMON WEEDICIDES ON IMPORTANT SOIL-BORNE PLANT PATHOGENS

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Sixteen weedicides viz. Arelon, Satwon, Basalin, Stomp, Atrazine, Fernoxone, Delron, Gramoxone, Glyphosate, Knockweed-36, Machette 5G, Stam-F-34, Tribunil 70 WP, Tafazine 50 WP, Tok-E-25 and Tolkan 50 WP were selected to study their effect on two important soil borne plant pathogenic fungi, viz. Fusarium sp. causing wilt diseases and Rhizoctonia sp. causing rotting in plants. The two fungi were obtained inpure culture on Czapecks agar medium from wilted arhar and rotted balsam plant respectively. Chemicals were added to test medium at 0, 100, 1,000 and 10,000 ppm ai concentration. Test Fungus was inoculated on chemical amended medium and radial growth of colony was measured on 3rd and 5th day after inoculation. Of the 16 weedicides tested against Fusarium sp., all except Glyphosate significantly inhibited growth of fungus compared to control, both on 3rd and 5th day. All of the 10 weedicides tested against Rhizoctonia sp., inhibited fungus growth on both days after inoculation compared to control. Further, there appeared to be in general, a significant decease in colony diameter with increasing concentration of chemical in the medium.

WEED CONTROL IN PULSES AND OIL SEEDS.

EFFECT OF NITROFEN, FLUCHLORALIN AND PENDIMETHALIN HERBICIDES ON THE GROWTH PARAMETERS OF GREEN GRAM (Vigna radiata L.)

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Influence of various doses of nitrogen, fluchloralin and pendimethalin (0.50, 1.00, 1.50 and 2.00 kg/ha— on growth parameters (AGR, RGR AND NAR) of green gram was examined. Results indicated no marked effect of herbicidal rates on AGR during 1-3 weeks of crop growth, whereas during 3-6 weeks and 6-9 weeks an increasing trend in AGR values was recorded with increasing rates of herbicides. However, unlike AGR, RGR and NAR values were found to be increased with increasing rates of herbicides during 1-3 weeks. Similar trend continued during 3-6 weeks and even these values were higher than those recorded with handweeded plants. Later during 6-9 weeks no significant variations were noted in RGR and NAR values due to herbicidal treatments.

EFFECT OF DIFFERENT INTERVALS OF WEED REMOVAL ON YIELD OF GREEN GRAM (Vigna radiata L.)

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Tests were conducted to evaluate the effects of weed removal at different intervals (0-7, 7-14, 14-21, 21-28, 28-35, 35-42, 42-49, 49-56 and 56-63 days after crop emergence) on yield of green gram. Results showed that weed removal during 21-28 days gave maximum yield. Whereas weed removal after this period i.e., 28-35 days drastically reduced the yield. It was also noted that further removal of weeds (35-42, 42-49, 49-56 and 56-63 days) had no significant gain in yield and results were comparable with unweeded control plants.

EFFICIENCY OF HERBICIDES FOR WEED CONTROL IN SUMMER MUNG BEAN

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Field experiment on weed control in mung bean **(Vigna radiata)** involving four hericides viz. Oxyflourefen (0.180 and 0.360 kg ai/ha), bladex (1.5 and 3.0 kg/ha), fluchloralin (0.9 and 1.8 kg ai/ha), and oxadiazon (0.625 and 1.250 kg ai/ha) at two rates with weed free condition and control (no weeding) was conducted on medium balck soil of Instructional Farm, Gujarat Agricultural University, Junagadh during summer season of 1984. All the herbicides were applied as preemergence next day of sowing dissolved in 500 litres of water.

The study reveal that all the herbicides at both the rates and weed free condition recorded significantly higher grain yield over control, bladex and oxyfluorefen. Bladex showed phytotoxic effect on mung. The highest grain yield recorded with weed free condition was comparable with oxadiazon 1.250 kg a.i./ha and fluchloralin 0.9 kg ai/ha. Barring weed free condition, herbicides oxadiazon 1.250 kg ai/ha recorded remarkably less dry weight of weed biomass. Maximum economic return was obtained with oxadizon 0.625 kg ai/ha (Rs. 1,901/ha) and 1.250 kg ai/ha (Rs. 2,032/ha) closely followed by fluchloralin 0.9 kg ai/ha (Rs. 1,738/ha).

WEED MANAGEMENT STUDIES IN SUMMER MOONG

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HISAR.

Application of fluchloralin (1 and 2 kg/ha as PPI), pendimethalin (1 and 2 kg/ha as pre-emergence) and sethoxydin (0.2 and 0.4 kg/ha as post-emergence) were compared with one hand weelding at 15 and 30 days after sowing and two hand weedings with hand pulling, wheel hoe and kasola at 15 and 30 days after sowing. All these treatments were compared with standard checks of weedy and weed free during 1983 and 1984. Two hand weedings at 15 and 30 days proved most effective in 1983 and 1984 as compared to weedy check. During 1984, effect of fluchloralin and pendimethalin at both rates was more than two hand weedings applied at 15 and 30 days after sowing. Sethoxydin did not have significant influence on the population of weeds but the dry weight of weeds was significantly reduced as compared to weedy check. Two hand weedings by wheel hoe and hand pulling and higher doses of pendimethalin and fluchloralin gave singnificantly higher yield as compared to weedy check during both the years.

FLORISTIC COMPOSITION OF Vigna unguiculata (L.) WALP. CROP COMMUNITY AGAINST CULTURAL AND HERBICIDAL TREATMENTS

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An experiment was conducted J.N.K.V.V. Campus College of Agriculture Research Farm, Gawlior (M.P.) during kharif season of 1981. Four hericides-nitrofen, flucholoralin, alachlor and pendimethalin each at two rates were compared with three cultural practices (hoeing 30 days after sowing, hand weeding 30 days after sowing and complete weed free) and control under three row spacings (30, 45 and 60 cm). The study indicated that weed density as wel as the IVI value of the crop and weeds were almost similar in all the row spacings. But the maximum grain yield was obtained with the closer row spacing of 30 cm. Amongst the weed control treatments the highest values IVI of crop and grain yield was found in complete weed free treatments. Herbicide nitrofen 3.0 kg./ha was next best treatment. The minimum grain yield and maximum IVI of weeds was obtained in control plot and treatments nitrofen 1.5 kg/ha, pendimethalin 1.0 kg/ha and hoeing 30 days after sowing were next in order. All herbicides under study at higher concentrations obtained higher value of crop IVI and grain yield and reverse was the case of weeds IVI.

WEED CONTROL IN GREEN GRAM WITH FLUCHLORALIN

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P. K. V., AKOLA

Field experiment on weed control in Mug bean **(Vigna radiata L.)** involving varied doses of fluchloralin with and without cultural operation, was conducted at Department of Agronomy, P.K.V., Akola in 1983-84. The study revealed that the pre-emergence application of higher dose of fluchloralin gave 12 per cent higher yield over traditional method of weed control. Maximum economic return was obtained with the application of fluchloralin @0.96 kg ai/ha.

EFFICACY OF DIFFERENT HERBICIDES AND CULTURAL PRACTICES ON WEED CONTROL AND POD YIELD OF COWPEA UNDER RAINFED CONDITIONS

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A field experiment was carried out to study the effect of herbicides and cultural practices on weed growth and pod yield of cowpea during kharif season of 1980 at J.N.K.V.V. Campus-College of Agriculture, Research Farm, Gwalior (M.P.) four herbicides - nitrofen (1.5 and 3.0 kg/ha), fluchloralin (1.0 and 2.0

kg/ha), alachlor (1.5 and 3.0 kg/ha), and pendimethalin (1.0 and 2.0 kg/ha), each at two rates were compared with three cultural practices (hoeing 30 days after sowing, hand weeding 30 days after sowing and complete weed free) and control. The study revealed that among all the weed control treatments, weed free treatment had the highest degree of weed control efficiency (95.7%) resulting into the highest pod yield and crop biomass. Herbicides - fluchloralin at 2.0 kg/ha and nitrofen at 3.0 kg/ha were the next best treatments in respect of pod yield. All herbicides under study at higher concentration recorded higher weed control efficiency and lesser weed index as compared to their lower concentration. The maximum values of weed biomass. weed index and minimum pod yield and crop biomass were obtained in control plot (weedy check).

HERBICIDAL CONTROL OF WEEDS IN BLACK GRAM

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Campus: DHOLI (Muzaffarpur)

An experiment on herbicidal control of weeds in black gram during the kharif season was conducted for two years (1977 and 1978). The treatments included two pre-emergence herbicides viz. Lasso @ 1.2 and 3 kg ai,/ha and Tok E-25 @ 1 and 2 kg ai/ha besides the mixture of the two @ 1 kg ai/ha each (pre-emergence), complete weed free situation, one hand weeding and weedy check. The mixed formulation was found more effective as compared to the individual herbicides even applied at higher doses, and was as good as complete weed free situation achieved through mechanical means. Yields in weedy check treatments were reduced by almost 50 per cent. Herbicidal weed control recorded higher yield and proved more profitable than handweeding.

EFFICACY OF HERBICIDES FOR WEED CONTROL IN URDBEAN (Vigna mungo)

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PANTNAGAR (Nainital)-263 145

Field experiment was conducted to evaluate Fluchloralin (0.5, 1.0 and 1.5 kg/ha), pendimethalin (0.5, 1.5 and 1.5 kg/ha), oxyfluorfen (0.1, 0.2 and 0.3 kg/ha) and fluazifop-butyl (0.125, 0.250 and 0.375 kg/ha) for weed control in urd bean.

Cyprus rotundus, Echinochloa colonum and Celosia argentea were most dominant weed species in the experimental field and together constituted more than 80% of total weed population. Oxyfluorfen at 0.2 and 0.3 kg/ha, pendimethalin at 1.5 kg/ha and fluoralin at 1.5 kg/ha were more effective in reducing the total weed population and dry matter of weeds.

Weedy condition caused 82.23% reduction in grain yield as compared to weed-free treatment. All the treatments produced significantly more grain yield than weedy check. None of the herbicidal treatments

produced grain yields at par with weed - free treatment. The grain yield produced with fluchloralin at 1.5 kg./ha was at par with its rate at 1.0 kg/ha and significantly higher than 0.5 kg/ha. The grain yield produced with pendimethalin at 1.5 kg/ha ws significantly higher than at 0.5 and 1.0 kg/ha. Pendimethalin at 1.0 kg/ha also produced significantly higher grain yield than at 0.5 kg/ha. Oxyfluorfen at 0.1 kg/ha produced significantly higher grain yield than at 0.2 and 0.3 kg/ha.

Pendimethalin and fluchloralin proved more promising than oxyfluorfen and fluazifop-butyl for weed control in urdbean.

TOLERANCE OF GRAM (Cicer arietinum) AND ASSOCIATED WEEDS TO HERBICIDES

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The tolerance of gram **(Cicer arietinum L.)** and weeds to herbicides viz., terbutruyn 0.8 kg/ha pre emergence (pre), oxadiazon 0.5, 0.75 and 1.0 kg/ha pre, isoproturon 1.0 kg/ha pe, oxyfluorfen 0.25 kg/ha pre, fluchloralin 1.0 kg/ha post emergence (Post em) at 30 days after sowing (DAS) and haloxyfop methyl 0.5 kg/ha post em was studied and weed control efficiency (WCE) was compared against weedy check and a hand weeding (HW) treatment. The major weed speices associated with gram crop were **Melilotus abla** Desr., **Chenopodium album** L., **Indigoferra** spp., **Sonchus arvensis** L., **Chroxophora parvifolia** Koltz. ex. Schwfth., **Vicia sativa** L., **Volutarella divaricata** Benth. & Hook. f., **Agremone mexicana** L. and **Digitaria sanguinalis** Henr. The emergence of al these weeds was highly inhibited by terbuturyn 0.8 kg/ha pre, oxadiazon 1.0 kg/ha pre and isoproturon 1.0 kg/ha pre. These herbicides showed greater WCE and gave the grain yield at par to one HW hence, suitable for weed control in gram. The monocot weed **Digitaria sanguinalis** was susceptible to fluchloralin, fluazifop butyle and haloxyfop methyl wile the dicot weeds were tolerant to the latter two herbicides. The highest WCE was found in turbutryn (95.2%) followed by oxadiazon (88%) and isoproturon (86.5%) which resulted the higher grain yield at pa to one HW, hence suitable for weed control in gram. All the herbicides tested at the different levels were tolerant to gram crop and no adverse effects on growth and yield attributes were noted.

COMPARATIVE STUIDES OF HERBICIDES IN RELATION TO AGRONOMICAL PRACTICES IN CHICKPEA (GAURAV).

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A field experiment, to study the effects of four herbicides (Fluchloralin, Oxadiazon, Pendimethalin and Methabenzthizuron) in relation to agronomical practices (weeding, intercropping and method of planting) on the gram yield as well as weeds in chickpea (Gaurav), was conducted on sandy loam soil of Haryana Agricultural University, Hisar. The yield reduction in gram caused due to weeds was observed to be 48 per cent. Hoeing at 25 or 25 + 45 days after sowing produced 92 per cent higher grain yield over

control. Amongst herbicides, fluchloralin and methabenzthiazuron pre-emergence @ 1.5 kg ai/ha increased the grain yield by 79% and 66%, respectively over control. Agronomical practices viz. intercropping with wheat and close spacing plantation of gram at 30 cms. apart (line to line) showed encouraging results.

CHEMICAL DEFLOWERING IN YAM BEAN (Pachyrhizus erosus) WITH 2,4-D SPRAY

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Various chemical and mechanical deflowering methods were compared for four consecutive years. No deflowering reduce tuber yields and income by 84.5 per cent. Manual deflowering recorded the tuber yield of 369.5 q/ha. Among various concentrations (0.25, 50, 75 and 100 ppm) of 2,4 - D (as Taficide-80), ppm spray during 50 per cent blooming stage of the crop gave the highest tuber yield (378.1 q/ha) and 21 per cent increase in income over manual deflowering.

EFFECT OF HERBICIDES AND CULTURAL PRACTICES ON WEEDS AND YIELD OF SOYBEAN (Glycine max (L.) Merrill).

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A field experiment on control of weeds in soybean, variety JS-72-44 under rainfed conditions was conducted during kharif season of 1983, at J.N.K.V.V. Campus - College of Agriculture, Research Fram, Gwalior (M.P.) to evolve suitable method of wed management in soybean. Four herbicides-fluchloralin (0.75 and 1.50 kg/ha), pendimethalin (0.75 and 1.50 kg/ha), oxadiazon (0.5 and 1.00 kg/ha) and prometryne (0.5 and 1.00 kg/ha); each of two concentrations were assessed by comparing the treatments of control (Weedy check), one hand weeding at 30 days after sowing, one hoeing at 30 days after sowing and weed free conditions. Results revealed that the weed free plot recorded the highest grain yield. Herbicides - oxadiazon at the rate of 1.0 kg/ha and fluchloralin at 1.5 kg/ha were the next best treatments in respect of grain yield and these treatments also controlled the weeds effectively. The maximum value of weed biomass and minimum grain yield were obtained in control plot.

The correlation of yield with biomass sink parameters and photosynthetic efficiency (biomass production) revealed that yield of soybean had significant positive correclation with crop biomass (r = 0.686). The positive corelation for yield attributing characters such as number of pods/plant, yield-plant and test weight with grain yield was also noted but these correlation coefficients were not found to be significant.

EFFECT OF LINURON, FLUAZIFOP—BUTYL AND THIOBENCARB ON SOYBEAN AND ASSOCIATED WEEDS

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Efficacy of pre-emergence application linuron, thiobencarb, each at 1.0, 1.5, 2.0 kg/ha and post-emergence application of fluazifop-butyl at 0.125, 0.250 and 0.500 kg/ha was investigated during 1982 to 1984 for weed control in soybean. **Eachinochloa colonum**, **Dactyloctenium aegyptium**, **Cyperus rotundus**, **Digitaria sanguinalis**, **Trianthema monogyna** and **Celosia argentia** were the major weed species in the experimental field. Linuron and thiobencarb at 1.5 and 2.0 kg/ha were more effective in reducing the density and dry matter production of weeds than at 1.0 kg/ha. Fluazifop-butyl at 0.25 and 0.50 kg/ha produced less density and dry weight of weeds than at lower rate of application.

Grain yield of soybean was reduced by 80.9% due to uncontrolled weeds. Herbicides at each rate of application produced more grain yield than weedy check. Linuron and thiobencarb at 1.0 kg/ha produced less grain yield than their higher rates of application. The two higher rates of these herbicides did not differ significantly with respect to grain yield. There was no significant variation in the grain yield of soybean due to different rates of fluazifop-butyl during two years. Fluazifop-butyl was at par with higher rates of linuron, thiobencarb and two manual weedings (20&45 DAS) and weed-free with respect to grain yield.

EFFECT OF WEED CONTROL METHODS ON THE QUALITY OF SOYBEAN CROP

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The experiment was conducted to evaluate the effect of various weed control treatments on the quality of soybean crop. The experiment was laid out in randomized block design with three replications. The herbicidal treatments were ten and the cultural treatments being three alongwith the control, thus making 14 treatments in all. The herbicides taken were - fluchloralin, methabenzthiazuron, nitrofen, oxadiazon, pendimethalin, carbyne, metribuzin, oxyfluorfen, bentazone and acifluorfen. The other treatments were - weed free, weeding once at 30 days after sowing and weeding twice at 30 and 45 days after sowing alongwith weedy check. Nitrogen and phosophorus contents in grains and stover and their uptake in plants, protein and oil contents were found to be maximum under weed free treatment and these were minimum under weedy check treatment. Weeding once and weeding twice treatments did not differ significantly with weed free treatment in respect of nutrients contents, their uptake, protein and oil contents. These treatments were closely followed by methabenzthiazuron, metribuzin and fluchloralin treatments. Oxyfluorfen at 0.2 kg a.i./ha and acifluorfen at 0.5 kg a.i./ha in particular were found to be phytotoxic to crop plants at early stages of crop growth, thereby effecting the quality of the crop.

WEEDING STRATEGY IN KHARIF SOYBEAN

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Combating kharif weeds, particularly sedges and perennial types in soybean in a hercuian task. Field studies were, therefore, taken up at four locations of Malwa region at Indore, Bhawarkuan, Dharampuri and Dewas in 1984, using Fusilade, Flex and Basalin all alone and at different rates and combinations with interculture and removal of narrow/broad leaf weeds. Results indicated that although maximum soybean yields were obtained in total weed free plot (Indore-30.2 g/ha, Bhawarkuan-31.4 g/ha, Dharampuri-32.3 g/ha, Dewas-35.0 g/ha), the weeding efficiency with either Fusilade + Flex (1.0 + 1.0 1/ha) Basalin (PPT-2.5 1/ha) + (one) was equally good. Comparing two weedy media, it was noted that eleminatino narrow leaf weeds is of vital importance than the broad leaf types in soybean system.

WEED MONITORING BY CHEMICAL RERSOURCES IN SOYBEAN SYSTEM OF MADHYA PRADESH

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Monitorino monocot or dicot weeds by the judicious use of specific herbicides is of vital importance in developing a suitable weed control system. Fusilade (Fusiafap-butyl) is targeted selectively to kill the most problematic weed **Cynodon dactylon**, **Panicum** spp., **Paspalum** spp and some othrs grassy types of the region. Basalin in popularly used for retarding early weed competition in soybean. Field studies were therefore, carried out at JNKVV Research Farm, Ujjain to evaluate the most economic herbicide in soybean using stomp (Penoxalin), Dual (Acetanitide), Goal (Oxyflurofen), Ronstar (Oxadizon), Antar Afalon (Linuron), Fusilade (Fusidofop butyl), Flex, Basalin, (Fluchloralin), Basagran (Bentazon), Antar, Igran in different rates and combinations to compare with weed free and weedy check. The results indicated that grassy weeds could be well monitored by the application of Fusilade, Linuron and stomp while monocot and dicot types could be kept within safe limits with Basalin, Goal, Antar and Dual herbicides. Pod development and grain yield of soybean were also infuenced substantially by the extent and nature of the weed kill.

EFFECT OF HERBICIDES ON WEED CONTROL IN LENTIL (Lens esculenta)

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Oxyfluorfen, pendimethalin, metribuzin, methabenzthiazuron and fluchloralin at different rates of application were evaluated for their efects of lentil and associated weeds in winter seasons from 1980-1983.

Chenopodiu album, **Fumaria parviflora**, **Melilotus alba**, **M. indica** and **Anagallis arvensis** were the dominant weed species in the experimental field. All the herbicides caused significant reduction in the density and dry wieght of weeds. Weed control efficacy was more at higher rates that at lower rates of application of respective herbcides. Pot-emergence application of oxyfluorfen caused more reduction in the weed dry weight as compared to its application as pre-emergence.

Grain yield of lentil was reduced by 66.5% due to uncontrolled weeds. Pre-emergence application of pendimethalin at 1.0 kg/ha, metribuzin at 0.5 kg/ha, methabenzthiazuron at 2.0 kg/ha and post-emergence application of oxyfluorfen at 0.05 kg/ha produced grain yields at par with weed-free condition.

EFFECT OF HERBICIDES ON WEED CONTROL IN (Sesamum indicum) GINGELLY

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Gingelly (**Sesamum indicum**) is an important oil seed crop of Andhra Pradesh raised both in Kharif and Rabi seasons. In Kharif, it is raised as a dry sown crop and in Rabi it is raised under protected irrigation. The growth of the crop during its initial stages is very slow and cannot copete with weeds. Hence a field trial in a randomised block design was conductd during Kharif 1984 at the Agricultural College campus, Bapatla in a sandy loam soil with herbicides ethyl at different concentrations. The herbicides were used as pre-emergence spray except fluchloralin which was sprayed and incorporated in the soil before sowing.

The herbicides oxyfluorfen, alachlor and butachlor had an adverse effect on germination of the seed, while the herbicides fluchloralin and diethatyl ethyl are safer compounds in respect of germination of Sesamum. The weed counts data indicated that all the herbicides recorded effective weed control compared to unweeded control upto 60th day after sowing. The herbicide oxyfluorfen @ 0.15 kg/ha alachlor @ 3.75 kg/ha and @ 2.5 kg/ha antor @ 3.0 kg/ha, fluchloralin @ 0.75 kg/ha recorded lower dry weight of weeds as compared to hand weeding, butachlor and unweeded control. Because of toxicity of oxyfluorfen on crop growth, lowest yield (70 kg/ha) was obtained followed by unweeded control (250 kg/ha), Maximum yield of 800 kg/ha was recorded with diethatyl ethyl followeed by fluchloralin @ 1.5 kg/ha (782 kg/ha), 0.75 kg/ha (711 kg/ha) and hand weeding (703 kg/ha). The herbicides butachlor, alachlor and oxyfluchloralin has to be tested further in gingelly for furhter confimation of results.

EFFECT OF HERBICIDES ON NUTRIENT UPTAKE BY WEEDS AND CROP AND ALSO ON THE QUALITY OF GROUNDNUT GENOTYPES

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A field experiment was conducted during monsoon 1983 to study the effect of different herbicides on

the nutrient uptake by weeds and crop and also on the quality of groundnut. Genotypes, The experiment consisting of 7 weed control treatments and two Groundnut genoutypes were replicated four times in a randomised block design.

Bunch group (Variety JL-24) has recorded significantly higher NPK uptake by weeds and also oil content of Groundnut. However, the NPK uptake and crude protein content of Groundnut were found significantly more in spreading group (9 Variety Kahri-3) as compared to Bunch group. Hand weeding followed by pendimethalin @ 1.5 kg ai/ha and Fluazifop butyl @ 0.5 kg. ai/ha were recorede lesser NPK uptake by weeds and were found better in Controlling of weeds. Even though the NPK uptake by two groundnut genotypes in hand weeding was significantly higher but on par with perdimethalin in P & K uptake. Hand weeding and all the herbicides except over control. The crude protein content in hand weeding was significantly more over control but on par with pendimethalin @ 1.5 kg ai/ha and Fluazifop butyl @ 0.5 kg ai/ha treatments.

EFFECT OF DEFFERENT METHODS OF WEED CONTROL ON GROWTH AND YIELD OF GROUNDNUT (Arachis hypogaea L.)

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To control the weeds in mansoon groundnut, five herbicides viz. alachlor, fluchloralin. Oxadiazon and pendimethalin each 1.5 kg/ha and 2, 4-D 1.0 kg/ha as pre-emergence alone and each with one hand hoeing at 30 days after sowing (DAS) were compared with two hand weedings (15 and 30 DAS), two hand hoeings (15 and 30 DAS), three hand hoeings (10, 20 and 30 DAS), one hand weeding at 15 DAS + one hand hoeing at 30 DAS, one hand hoeing at 15 DAS + one hand weeding at 30 DAS and a unweeded control. The soil was sandy clay having medium fertility status and neutral pH.

The dominant weed species were **Echinochloa colonum** (L) Linn., **Sphaeranthus indicus** L., **Eclipta alba** Massk, **Ageratum conyzoides** L., **Corchorus olitorius** L. and **Cyperus rotundus** L. having relative density of 17.1, 14.9, 14.2, 12.0, 9.8 and 4.6% respectively. Amongst the herbicides alone pre-emergence application of oxadiazon, alachlor and pendimethalin resulted in significantly lower weed biomass than others. Oxadiazon had phytotoxic effects at early stage. Alachlor + one hand hoeing at 30 DAS gave significantly higher pad yield and also proved economical for controlling the weeds in ground nut followed by two hand weedings. Amongst herbicides alone alachlor and pendimethalin produced almost similar pod yields which were significantly superior than others.

INTERACTION OF PRE—EMERGENCE HERBICIDES AND LEVELS OF PHOSPHATE ON WEED CONTROL IN GROUNDNUT

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A field trial was conducted in a split plot design with three replications during 1981-82 (rabi) at the

OUAT Agricultural Fram, Bhubaneswar to study the interaction of different herbicides and graded levels of phosphate on weed control in groundnut. There were 4 main plot treatments with 0, 20, 40 and 60 kg/ha P_2O_5 and 6 sub plot treatments with various weed control methods. Nitrofen @ 2.0 kg/ha, Oxadiazon @ 1.0 kg/ha and Na salt of 2,4-D @ 2.0 kg/ha were tried as pre-emergence sprays on the next day of sowing and fluchloralin @ 1.0 kg/ha as pre-sowing soil drenched spray a day before sowing and were compared with cultural practice (one howing followed by two weedings) and un-weeded control.

There was no significant influence on weed population and dry weight of weeds by phosphate application.

Higher dose of phosphate application showed significant imporvment in root and shoot biomads and number ofnodules of groundnut plants.

While considering the main effects, the highest doses of phosphate application (60 kg P_2O_5/ha) were found to be most promising and recorded maximum pod yield. In respect of the sub-effects (Weed control methods) maximum pod yield was obtained in Oxadiazon treatment. Treatment with cultural practice was next in order, while there was significant reduction in pod yield with un-weeded control treatment over other treatments tried.

STUDIES ON THE SENSITIVITY OF TORIA TO HERBICIDES CONTAMINATED WATER

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An experiment was conducted in aquatic weed control area in order to study the sensitivity of toria to herbicides contaminated irrigation water in respect to its growth and yield. The treatments were, three herbicides with two concentrations alongwith the control. The herbicides used were 2,4-D and glyphosate at 2.5 and 5.0 ppm concentrations and paraquat at 0.5 and 1.0 ppm concentrations. Irrigation water, contaminated with the herbicides, equal to one irrigation was applied to every plot as and when irrigation was required by the crop. One treatment of uncontaminated water as control, was also maintained for comparison. Only 2,4-D at both concentration (2.5 and 5.0 pp m) was found to have phytotoxic effect on toria crop, as it had adverse effect on plant stand, fresh and dry weight of plants, plant hight, pods per plant, grains per pod, yield per plant, grain. and stover yield per hectare. Gyphosate and paraquat were at par with the control treatment in respect of growth, yield and yield attributes. Thest weight and oil content were found to be unaffected with all the herbicides.

EFFECT OF TIME OF WEED REMOVAL ON THE PERFORMANCE OF CASTOR CV. GAUCH—1 UNDER RAINFED CONDITIONS OF NORTH GUJARAT.

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Field experiments to study the effect of time of weed removal on performance of castor were

comducted under the All India Co-ordinated Research Project on Dryland Agriculture, Gujarat Agricultural University, Sardar Krushinagar, It was found that, the weeds required about 15 days to establish themselves. The crop-weed competition was not observed at the during this period. The weed competition with the crop began after this period and became severe after 30 days of sowing. Further more, it has been observed that the severness of the weed competition continue to a period of 15 days i.e. upto 45 days after sowing. Thereafter the effect of weeds on crop was found less and ultimately there was no any effect after 60 days of sowing.

WEED MANAGEMENT IN CROPPING SYSTEMS, INTEGRATED WEED CONTROL AND WEED CONTROL IN NON-CROPPED AREA

NITROGEN ECONOMY IN RICE THROUGH INTEGRATED WEED CONTROL METHODS

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Field experiments were conducted to study the effects of integrated weed control methods to economise nitrogen in direct seeded upland rice during the monsoon seasons of 1981 and 1982. Treatments consisted of five nitrogen levels, 0, 30, 60, 90 and 120 kg/ha in main-plots and eight weed control treatments, weedy check, one hand weeding (20 DAS), three hand weedings & three mechanical weedings (15, 30, DAS), butachlor 1.5 kg (pre-em), butachlor 1.5 kg + propanil 1.0 kg (Post-em), butachlor 1.5 kg + one hand weeding (30 DAS), and butachlor + 2 mechanical weedings (30 & 45 DAS) in sub-plots.

Nitrogen application proved instrumental in increasing the nitrogen loss by weeds and maximum nitrogen loss was recorded at highest level of nitrogen. Nitrogen depletion by weeds was maximum at 70th day stage and thereafter remained constant till 100th day, irrespectie of treatments. Integated weed control treatments, viz. buthachlor + one hand weeding or two mechanical weedings or propanil had minimum nirogen drain through weeds than their seprate application. The grain yield sowed marked effect of nitrogen levels and maximum grain yield was obtained at highest level of nitrogen. Under weed control treatmens, combined application weed control methods had significantly more grain yield than their separate application. Repeated mechanical weeding (thrice) was not found as effective as combination of two separate weed control practices. The interaction effect of nitrogen levels and weed control had remarkable effect in saving nitrogen loss due to weeds and producing grain yield. Grain yield obtained in tegrated weed

control methods without nitrogen application was equal to grain yield obtained in weedy check at 120 kg. nitrogen per ha. and grain yield obtained under integratd weed control methods at 60 kg N/ha. was equal to grain yield obtained under one hand weeding at 120 kg N/ha.

STUDIES ON THE INTEGRATED WEED CONTROL IN PIGEON PEA (Cajanus cajan (L) MILLS P.)

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Field studies carried out at Punjab Agricultural University, Ludhiana during the Kharif season of 1981 and 1982 included treatments of herbicides like fulchloralin, oxadiazon, cyanazine and terbutryn alone and in combination with mechanical methods of weeding for control of weeds in pigeonpea. None of the herbicides alone was effective against the perennial weeds like **Cyhodon dactylon** and **Cyperus rotundus,** however oxadiazone, fluchloralin and terbutryn could reduce the population of **Eleucine aegyptiacum.** Herbicides at lower doses followed by one hand weeding gave effective control of Kharit weeds. Oxadiazone @ 0.5 kg ai/ha as pre-mergence application followed by one hand weeding brought about highest grain yield followed by that with terbutryn @ 1.0 kg ai/ha and two hand weedings. Pre-plant and pre-emergence application of fluchloralin and cyanazine respectively proved phytotoxic to the crop and caused significant reduction in grain yield as compared to two hand weedings.

INTEGRATED WEED MANAGEMENT IN GROUNDNUT BASED CROPPING SYSTEM

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Field expriments were conducted in red sandy gravelly soils of Bhavani sagar, during 1983-84. Effect of three herbicides viz., oxadiazon 0.8 kg/ha, fluchloralin 1.0 kg/ha and metolachlor 1.0 kg/ha under two methods of application (Pre-sowing incroporation and pre-emergence) followed by one manual weeding or working star type weeder was studied in bunch groundnut with limited irrigation. Annual broadleaved weeds were the dominant weeds.

Pre-sowing application of fluchloralin 1.0 kg/ha or pre-emergence oxadiazon 0.8 kg/ha followed by one manual or machnical weeding was effective and increased the pod yield of 2224 at 2183 kg/ha respectively. In the succeeding crop of sorghum, the highest grain yield of 2829 kg/ha was recorded under additive effect of atrazine 0.4 kg/ha with residues of oxadiazon followed by one manual weeding. Either the residues of the herbicide tried alone or in combination with atrazine tried for the second crop of sorghum had no influence on the third crop of cowpea.

INTEGRATED WEED CONTROL IN UPLAND DRILLED RICE

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To manage the weeds in upland-drilled rice the integrated methods in which, hand weeding (HW 30 days after sowing (DAS) and herbicides were tested in combinations. Thirteen tretments viz. thiobencarb 1.5, 2.0 kg/ha at 8 days after sowing (DAS), pendimethalin 1.0 2.0 kg/ha pre em, oxadiazon 0.75, 1.0 kg/ha, pendimethalin 1.0 kg/ha pre + bentazone 0.75 kg post 30 DAS, pendimethalin 1.0 kg/ha pre + 1 HW at 30 DAS, oxadiazon, 0.75 kg/ha pre + 1 HW 30 DAS, thiobencarb 0.75 kg/ha pre + bentazone 0.75 kg/ha post 30 DAS, thiobencarb 1.5 kg/ha at 8 DAS + 1 HW at 30 DAS, 2-hoings at 20 and 40 DAS and 2 HW at 20 and 40 DAS were tested against a weedy check. The weed flora consisted of **Gyperus irria** (986 m^2), **Phyllanthus niruri** (50)m **Digitaria adscendence** (33 m^2), **Echniochloa crusgali** (24 m^2), **Cyperus rotundus** (15 m^2), **Physalis minima** (7 m^2), **Portulaca oleracea** (6 m^2), **Trianthema monogyna** (6 m^2), **Ecliptallba (2 m^2)** and **Comelina communis** (1 m^2).

Amongst herbicide alont, effective control of all the weeds (except **Cyperus rotundus, Cynodon dactylon, Eclipta alba** and **Commelina communis)** was noted in oxadiazon 1.0 kg/ha pre having 83% weed control efficiency (WCE) followed by oxadiazon 0.75 kg/ha pre (75%). The WCF of pendimethalin 2 kg/ha pre and thiobencarb 2 kg/ha at 8 DAS was 64% and 38% respectively. The highst WCE was notd in oxadiazon 0.75 kg/ha pre + one HW at 30 DAS (93.7%) followed pendimethaline 1.0 kg/ha pre + one HW at 30 DAS (92.2%). Post em application of bentazon was effective to control **C. irria** and **Digitaria adscendence.** while thiobencarb controlled **Echinochloa crusgalli.**

The highest grain yield was obtained from oxadiazon 1.0 kg/ha pre em (3628 kg/ha) against the weedy check (1612 kg/ha). Combining of one HW with oxadiazon 0.75 kg/ha could not increase the yield significantly as compared to oxadiazone alone.

INTEGRATED METHOD OF WEED CONTROL IN DIRECT SOWN UPLAND RICE

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Field experiment was conducted to study the effects of integrated weed control methods in rice. The treatments consisted, weedy check, two hand weedings, and three pre-emergence herbicides, viz. thiobencarb 1.5 kg, butachlor 1.5 kg, and basalin 1.0 kg, and all these herbicides were combined with on hand weeding (30 DAS). one mechanical (30 DAS) and 2,4-D 1.0 kg. The most dominant weed - species in experimental field were, **Echinocloa colonum, Cyperus rotundus cyperus iria Eclipta abla** and **Cynodon dactylon. Out of total weed species. Echinochloa** spp. constituted about 70 per cent.

Among herbicides, benthiocarb was found most effective in controlling weeds. The maximum grain yield (36.85 q/ha) was obtained under combination of benthiocarb + one hand weeding which was even higher than two hand weedings (30.25 /q/ha). The next best treatment combinations in respect of weed-control and yield were basalin + 2,4-D, basalin + one hand weeding and butachlor + one hand weeding.

INTEGRATED WEED MANAGEMENT IN PRE—SEASONAL SUGRACANE

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In two years studies (1979-80 and 1981-82), at Rahuri, efficient weed control was obtained either from four hand weedings or two applications of asulox-40 (3.4 kg/ha) + actril D.S. (1.4 kg/ha) at 30 and 90 days Integrated weed management involving pre-emergence asulox-40 (3.4 kg/ha) + actril D.S. (1.4 kg/ha) and hand weeding at 90 days also gave satisfactory weed control. All these treatments gave significant increase in sugarcane and sugar yields over weedy check and resulted in higher monetary return (2.4 kg/ha) in second year. From economical point, integrated method was more beneficial than either mechanical or chemical method alone.

STUDIES ON INTEGRATED METHODS OF WEED CONTROL IN RAINFED COTTON (SRT—1) UNDER MARATHWADA CONDITIONS

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A filed trial was conducted during kharif season of 1982 to assess the performance of herbicides in comparison with cultural practices for controlling weeds in rainfed cotton. Treatment consisted of weedsy check (control); weed free up to harvest; Recommended cultural practice; herbicides viz- fluchloralin, diuron, oxadiazon alone and in combination with cultural practice.

Dominant weeds were **Cynodon dactylon; Denebru sp.; Cyperus rotundus; Corchorus acutangulus; Argemone mexicana; Acalypha indica** and **Euphorba hirta.** Studies revealed that maximum seed-cotton (1910 kg/ha) was recorded in weed free plot and was significantly superior to weedy check, Fuchloralin (0.60 kg ai/ha) and Diuron (1 kg ai/ha). Lower dose of herbicides combined with cultural practice proved superior to their higher doses applied alone. Similar trend was also noticed in dry weed weight and weed control efficiency. Diuron applied as post emergence spray proved ineffective.

INTEGRATED WEED MANAGEMENT IN SOYBEAN (Glycine max (L.) Merrill)

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Three years filed experiments on integrated weed management in soybean var. JS-2 were carried out in which four herbicides viz., fuchloralin 1.0 kg/ha ppi, alachlor 1.0 kg/ha, metribuzin 0.75 kg/ha and pendimethalin 1.0 kg/ha as pre emergence were tested alone and with one hand weeding at 45 DAS and compared with two hand weedings at 30 and 60 DAS and a weedy check. The Major weed species in the experimental field were **Echinochloa crusgalli, Cyperus spp., Phyllanthus niruri, Corchorus acutangulus, Aeschynomene indica** and **Hibiscus micrathus.** The highest weed control efficiency was noted under two hand weedings (96.7%) followed by fluchloralin 1.0 kg/ha + one hand weeding (93.5%) and metribuzin 0.75 kg/ha + one hand weeding (92.9%). Amongst herbicide alone pendimethalin 1.0 kg/ha (83.5%) followed by fluchloralin 1.0 kg/ha (81.6%) and metribuzin 0.75 kg/ha (80.8%) controlled the weeds effectively. The treatment which had better weed control eficiency they also acquired higher harvest index. The plots treated with pendimethalin 1.0 kg/ha + one hand weeding gave the higher yield (2300 kg/ha) and maximum net return (Rs. 3,805 kg/ha) follwed by fluchloralin 1.0 kg/ha* one hand weeding (2259 kg/ha, Rs. 3,629/ha) and metribuzin 0.75 kg/h + one hand weeding (2211 kg/ha, Rs. 3,509/ha). Amongst herbicide alone, pendimethalin 1.0 kg/ha gave the higher yield and net profit followed by metribuzin 0.75 kg/ha and fluchlralin 1.0 kg/ha. The weed index was 75.2% under control.

INTEGRATED WEED MANAGEMENT IN COTTON BASED CROPPING SYSTEM

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A field experiment was carred out with pre-emergence application of fluchlorelin (0.75 and 1.0 kg/ha) and oxyfluorfen (0.075 and 0.01 kg/ha) with and without annual weeding in cotton pure stand and inter cropped with onion or greengram.

The weed flora of the experiment filed consisted of four species of grasses and sedges and 14 species of broad leaved weeds with predominance of **Doctyloctenium aequptium** Beauv in grasses and **Trianthema portulacastrum** Lin. in broad leaved weeds.

Pre-emergence oxyfluorfen 0.1 kg/ha ollowed by one manual weeding recorded the highest seed cotton yield of 22.3 q/ha. But in case of intercropped fields, pre-emergence oxyfluorfen 0.1 kg/ha with late hand weeding registered highest onion yield of 1233 kg/ha, whereas in greengram in tercropping an yield of 260 kg/ha of grain was recorded in fluchloralin 1.0 kg/ha followed by one manual weeding.

The was no phytotoxic residues by the use of herbicides to the succeeding crop of sorghum sparyed with pre-emergence application of atraxine at 0.4 kg/ha.

INTEGRATED WEED CONTROL IN JUTE

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Field experiment on weed control in jute (**Corchorus oiltorius** L.) involving fusilade and fluchloralin at varied doses with or without cultural operation was conducted at the farm of the institute in 1984.

The study revealed that fusilade 0.188 kg/ha 20 DAS + hoeing (twice) in line sown jute produced maximum fibre yield (31.3 q/ha). This was closely followed by fusilade 0.125 kg/ha 20 DAS + fusilade 0.188 kg/ha 40 DAS on broadcast sown jute produced fibre yield 31.2 q/ha. While fusilade along at 0.125 kg/ha 20 DAS also produced 26.7 q/ha of fibre which was superior to twice manual weeded check (which produced 24.7 q/ha.) under broadcast sown condition.

It appeared that fusilade was safe to jute but was effective against **Echinochloa colonum** L., **Eleusine indica** L. and **Leptochloa** species the predominent weed flora of jute field.

WEED CONTROL IN WHEAT—RAYA INTERCROPPING SYSTEM

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The response of various herbicides for finding the selectivity in both wheat and its intercrop (raya Var. RH—30) was evaluated in field research at HAU Farm during 1982 and 1983.

Isoproturon applied as post-emergence controlled weeds most effectively as compared to the application of fluchloralin and pendimethalin applied as pre-emergence at 1 kg/ha. All the herbicides gave significantly higher yield over weedy check. Isoproturon gave temporary injury to the raya crop but yield was not significantly reduced as compared to fluchloralin and pendimethalin. The growth and yield of wheat was significantly higher in Isoproturon treated plots as compared to pendimethalin and fluchloralin treated plots.

EFECTIVENESS OF VARIOUS HERBICIDES ON WEED CONTROL IN INTERCROPPING OF CHICKPEA AND RAYA

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The effectiveness of fluchloralin (1 kg/ha, PPT) pendimethalin (1 kg pre-emergence) and oxyflurofen (0.2 kg/ha pre-emergence) on the control of weeds in chickpea and their effectiveness on the intercrop of raya was evaluated in filed trials during 1982 and 1983.

Herbicidal efficiency in terms of weed population and dry weight of weeds and selectivity of chickpea

and rays were assessed. **Chenopodium album** and Lathyrus a phaca were the main weeds in 1982 and **Chenopodium album** was the major component of weed flora in 1983. In 1982, fluchloralin and in 1983 pendimethalin and fluchloralin proved superior in controlling weeds. The grain yield of chickpea and raya were significantly higher in all the herbicide treated plots as compared to weedy check. However, weed free check remained significantly superior as compared to all the herbicides during both the years

EVALUATION OF WEEDFREE MAINTANANCE FOR MUSTARD AND POTATO IN SIKKIM.

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Field experiments were carried out to study the effect of duration of weedfree maintanance in Mustard and Potato during rabi 1980-81 and 1981-82. The predominant weeds were **Polygonum capitata,** L, **Cyperus rotanuds,** L, and **Drymaria cordata.** L. Maximum weed population and drymatter of weeds were observed in weedfree till zero days followed by subsequent weeding. In mustard, maximum seed yield (13.00 q/ha) was obtained, when plots were kept weedfree for 50 DAS (11.49 q/ha) and found significantly superior over weedfree till 0, 20, 35 DAS. The increase in seed yield over control was 70.40% and 50.60% respectively. In potato, maximum tuber yield (100.23 q/ha) was obtained, when plots were kept weedfree till harvest followed by weedfree till 45 DAS (98.83 q/ha) and found significantly superior over all other treatments i.e. weedfree till 0, 15 30, 60, 75 DAS. The increase in tuber yield over control in these treatments were 39.10% and 37.20% respectively. Growth characters like plant height was also influence by these treatments.

WEED SHIFT IN COTTON BASED CROPPING SYSTEM

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Field experiment was conducted in black clay loam soils with pH 8.4 of Tamil Nadu Agriculturalt University, Coimbatore in winter irrigated cotton based cropping system during 1983-84.

The weed flora of the experimental field consisted of four species of grasses and sedges and 14 species of broad leaved weeds with predominance of **Dactyloctenium aegyptium** Beauv. in grasses and **Trianthema portulacastrum** Linn. in broad leaved weeds.

There was a gradual weed shift from **Trianthema portulacastrum** Linn. to other broad leaved weeds, grasses and sedges in the later stages of crop growth.

Between the two intercropping system greengram intercropping had a pronouneed effect on weed control that too 5 to 10 per cent control over pure stand and onion intercropped cotton. In the residual crop of sorghum cumulative effect of Oxyfluorfen at 0.1 g/ha residue with atrazine 0.4 kg/ha recorded 90 to 95 per cent control of major and total weeds.

EFFECT OF BUTACHLOR APPLICATION IN RICE VAR. CO.43 AND SUBSEQUENT GREENGRAM VAR. CO. 4

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A rice fallow greengram rotation in 1983-84 was conducted with the objective to study the effect of pre-emergence butachlor on rice and subsequent greengram. The crops were grown at TNAU farm in a clay loan soil containing 36.4 per cent clay with a pH 7.5 and 1.27 per cent organic matter. Medium duration rice var. Co.43 was planted under lowland during Kharif 1983 and pre-emergence butachlor was applied at 0, 0.5, 1.0, 2.0, and 4.0 kg/ha. After the harvest of rice greengram var. Co.4 was dibbled in rice stubbles. The plots were sub divided into two with and without pre-emergence application of fluchloralin at recommended dose of 0.75 kg/ha. In low land planted rice var. Co.43, the chlorophyll content at 20 DAT was affected by butachlor application which however reganied at 40 DAT. The yield parameters, yield, nutrients content and uptake by grain and straw were remain unaffected due to higher levels of butachlor application. The grain yield of subsequent greengram var. Co.4 was also not affected in both fluchloralin applied and non-applied plots.

WEED SMOTHERING ABILITY OF LEGUMES IN MAIZE (Zea mays L) BASED INTRCROPPING SYSTEM

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Weed smothering ability of legumes in maize based inter-cropping system was conducted during kharif season of 1983 at Agricultural College Farm, Dharwad. The experiment consisted of 24 treatments with 12 main plot and 2 sub plot treatments The main plot treatments included legumes - black-gram, soybean, greengram, cowpea and groundnut in maize crops with two row spacing 60 x 30 cm. and 90 x 20 cm. Sub plot treatments included weeding at 40 days and no weeding. The experiment was laid out in split-plot design with 3 replications.

Maize with one row of soybean or cowpea was found to be superior in its weed smothering ability and maintaining the maize yield on par with sole crop of maize. The other legumes which were effective in weed smothering were green-gram, blackoram and groundnut in that order.

STUDIES ON THE WEEDS OF ARABLE LANDS AND RUDERAL HABITATS-I-SOCIOLOGY AND FLORISTICS

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The paper presents a detailed ecological and taxonomic analysis of the weeds associated with

various arable lands and ruderal habitats in Kashmir Valley. In all, 247 weeds belonging to 44 families and 175 genera have been put on record Besides the frequency, cover and abundance of the weeds, a comprehensive account on the different weed-habitat associations, the distribution pattern of weeds as well as the influence of edaphic factors on the weed-complexes of various habitats has been ascertained. Based on the varied phenophases, weeds have been sorted into six sociological groups.

MASSIVE ERADICATION OF SOME NON-CROP-LAND WEEDS THROUGH APPLICATION OF 'ARSENAL'

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Field studies conducted at the Kalyani township, West Bengal during 1984 provided excellent long-trm weed control on non-crop area. 'ARSENAL' (Isopropylammonium 2- 4-isopropyl-4 methyl-5 oxo - 2 imidazolin- 2 yl nicotinate) was applied once only at different doses. Weed count was taken regularly at an interval of 10 days. All the treatments represented differential satisfactory result. Obviously, higher dose showed a quick-knock down effect to some weeds and death was colossal. Lowest dose also gave a complete kill of most of the weed spp. though of course at slow rate. **Jatropha gossypfolia, Theprosia purpurea, Croton sparsiflorus** were some of the woody and semiwoody annual victims which were competely damaged and no regeneration could be noted within 2 months of its application. The meristems were attacked first and then gradually moved downwards. The herbicide was absorbed through roots and leaves causing death of roots and shoots. Among the weeds tested, **Glycosmis penaphylla** gave a cetain degree of resistance.

Complete kill was observed even with the lowest dose of 0.25 kg ai/ha at 30 days after application whereas it took only 10 days when the dose was increased to 1.5 kg ai/ha. Massive kill was recorded within 15 days of application with 0 75 1.0 kg ai/ha.

With the above record, it can be concluded that if it is to be applied in Rail roads and Air-ways 0.25 kg ai-0.50 kg ai/ha is sufficient. To have an immediate effect through 'ARSENAL' 1.5 kg ai/ha is considered to be essential. However, to get an optimum economic return, a dose of 0.75 - 1.0 kg ai/ha can safely be recommemded.

NON CHEMICAL WEED CONTROL WITH LOW COST INPUTS

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The essence in the concept of Integrated Pest Management (IPM) is the minimum use of pesticide chemicals coupled with all possible effective cultural or management practices to keep down the pets (Weeds, Insects and disease pathogens) below the economic threshold level. With the recent MIC gas leak tragedy from the Pesticide factory at Bhopal, a fresh thinking of the research on controlling all kinds of

pests by non chemical method has been started in a big way. Non chemical methods like tillage during fallow after harvest of main kharif rice (Aman) to prevent weeds from seeding; growing of paira crop to smother the post-harvest weeds after kharit transplantd rice; stale seed bed technique particularly for usually more weedy upland direct seeded rice (Aus paddy) and jute crops; closer spacing; slightly higher seed rate; skipping basal, dose of nitrogen at sowing to avoid growth of weeds with more vigour; use of varieties of crop with more competitive ability with weeds and practice of inter cropping in upland direct seeded crops have been found to grow rice and jute crops fairly free from weed competition with considerable increase in yield.

FUTURE STARTEGIES FOR WEED—RESEARCH IN INDIA

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Intensification of agriculture is the sine-qua-non for metting our food need and in the wake of increasing energy-crisis, an efficient management of intensive crop production enterprises, which are also energey-intensive, is most urgently needed. Weeds share a substantial proportion of energy-use in agriculture by way of reduced fertilizer and water use efficiencies and in terms of energy-use in other cultural practices. So far, the weed research has centred on individual crops only. Results of researches have shown ample evidences for increasing food production through various forms of inter-or sequential intensive cropping systems. Weed dyanamics and control measures in different cropping systems, thus, need to be studied with due care on the protection of the environment.

WEED CONTROL IN COMMERCIAL, MEDICINAL AND FORAGE CROPS

WEED MANAGEMENT IN COTTON

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The experiment was conducted at the farm of Agronomy Deptt., P.K.V., Akola during the kharif season of 1980-81 & 1981-82. Th experiment was laid out in a randomised block design with four replications. The pre-sowing application of fluchloralin (basalin) @ 2 L /ha and diuron @ kg/ha alone and in combination with one weeding or one hoeing constituted six treatments. Additional treatments were two

hand weedings plus two hoeings i.e. cultivators' practice and control i.e. unweeded check.

Both the herbicides in combination with one weeding or one hoeing recorded similar weed control. As regards the dry weight of weeds, the chemical treatment in combination with one weeding or hoeing proved beneficial in reduction of dry matter production of weeds followed by the cultural method. Total uptake of nitrogen by weeds was highest in control followed by basalin and diuron alone and the lowest uptake of nitrogen was recorded under the cultivators' practice.

Removal of phosphorus by weeds was the least in the treatment cultivators' practice. The highest removal of phosphorus by weds was recorded in the treatment control, followed by basalin and diuron alone.

The application of herbicides as well as the cultivators' practice increased the seed cotton yield significantly over control. Application of basalin in combination with one weeding or one hoeing was at par with the cultivators' practice of two hoeings plus two weedings. Application of basalin or diuron alone recorded significantly lower yield than the cultivators' practice.

Presowing application of basalin @ 2 1/ha in combination with one hand weeding at 60 days as well as pre-emergence application of diuron @ 1 kg/ha in combination with one hoeing at 60 days were equally effective and resulted in similar cotton yield obtained under the cultivators' practice of two weedings plus two hoeings.

EFFECT OF DIFFERENT METHODS OF WEED CONTROL ON JUTE (Corchorus capsularis L) AT VARYING FERTILITY LEVELS

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The experiment was conducted on loamy sand soil during year 1983 at O.U.A.T. Agricultural Farm, Bhubaneswar to study the relative efficiency of different weed control methods in jute in low land. Pre-sowing soil application of fluchloralin and pre-emergence soil application of benthiocarb ad oxyfluorfen were investigated with conventional weed control methods (One mechanical hoeing and at 15 DAS supplemented with one thorough manual weeding at 30 DAS) and un-weeded control in relation to F 0 (0-0-0), F_1 (30-15-15 kg N, P_2O_5 and K_2O/ha respectively, F_2 (60-30-30 kg N, P_2O_5 and K_2O/ha respectively), and F_3 (90-45-45 Kg N, P_2O_5 and K_2O/ha respectively) fertilizer levels in a split plot design with three replications. Application of fertilizer had marked effect on the fibre yield. Yield increased significantly upto F3 (90-45-45). Each sucessive level proved statistically superior to its lower dose. Conventional weed control method appeared promising for effectie control of associated weeds. which consequently raised the fibre yield significantly over herbicidal treatments and un-weeded control (68.77%). Herbicidal treatments with benthiocarb, fluchloralin and oxyfluorfen were next in order recording 59.02 %, 53.53 %, and 50.97 % higher yield of fibre respectively over un-weeded control. The fibre yield increase was associated with decreas

CHEMICAL WEED CONTROL IN SUGARCANE (Saccharum oficinarum L.)

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A filed experiment consisting of eight herbcidal treatments. viz. metribuzin as pre-emergence at 2 kg/ha followed by 2,4-D at 1 kg/ha 60-70 days after planting (T^1), 2,4-D at 1 Kg/ha + paraquat at 0.5 kg/ha 20 and 60 days after planting(T^2). metribuzin as pre-emergence at 2 kg/ha followed by 2,4-D at 1 kg/ha + paraquat at 0.5 kg/ha 60-70 days after planting (T^3), atrazine as pre-emergence at 2 kg/ha followed by 2,4-D at 1 kg/ha + paraquat at 0.5 kg/ha 60-70 days after planting (T^4), atrazine as pre-emergence at 2 kg/ha followed by 2,4-D at 1 kg/ha 60-70 days after planting and paraquat at 0.5 kg/ha 80-90 days after planting and paraquat at 0.5 kg/ha 80-90 days after planting (T^5), asulum as pre-emergence at 2 kg/ha (T^6), asualum as post-emergence at 2 kg/ha (T^8) in addition to conventional weeding (T^9) and weedy check (T^{10}), was conducted on sugarcane variety Co 7314 during 1983-84.

The herbicideal treatments T^1, T^2, T^3, T^4, T^5, & T^8, being statistically at par with each other and also with that of conventional weeding. proved significantly superior to herbicidal treatments T^6 & T^7 and weedy check in respect of production of millable canes, cane yield and reduction in dry matter accumulation of weeds. These effective herbcidal treatments increased the cane yield ranging from 122 to 145 per cent over weedy check (345 q/ha) by controlling almost all the weeds, namely **Cyperus rotundus**, **Cynodon dactylon**, **Convolvolus arvensis**, **Trianthema monogyne** and **Amaranthus** spp., at early stages of crop growth. However, **Cyperus rotundus** and **Cynodon dactylon** again revived in the month of June. The most effective herbicidal treatment T^3 (metribuzin at 2 kg/ha pre-emergence followed by 2,4-D at 1 kg/ha + paraquat at 0.5 kg/ha 60-70 days after planting) reduced the dry matter accumulation of weeds to the extent of over 78 per cent. The quality traits were not significantly influenced by the appication of herbicides.

EFFECT OF DIFFERENT DOSES AND TIMES OF APPLICATION OF METRIBUZIN ON WEED FLORA, YIELD AND QUALITY OF SUGARCANE

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Studies were undertaken during 1983-84. to find out the optimum dose and time of application of metribuzin (Sencor) in controlling the weeds in sugarcane. Three doses of metribuzin viz. 0.5, 1.0 & 1.5 kg/ha with three times of its application i.e. 2-3 days after planting, three weeks after planting and six weeks after planting were compared with recommended dose of atrazine (2 kg ai/ha pre-emergence), conventional weeding and weedy check.

Mertibuzin @ 1.0 and 1.5 kg/ha, three weeks after planting found as effective as atrazine in controlling dominant weed species viz. **Cyperus rotundus, Cynodon dectylon Convolvolus arvensis, Trianthema monogyna** in the experimental field except **Sorghum halepense.** However, **Cyperus rotundus** and **Cynodon dactylon** again revived at the advent of monsson season which might have caused reduction in cane yield in these plots in comparison to conventional weeding. In unweeded plots about 78 per cent higher dry matter of weeds accumulated at grand growth stage of sugarcane. The maximum cane yield (690.48 q/ha) was recorded in conventional weeding followed by atrazine @ 2.0 kg ai/ha pre-emergence (617.36 q/ha) and metribuzin @ 1.0 and 1.5 kg/ha, three weeks after planting (613. 38 and 611.94 q/ha) which were statistically at par and found significantly higher than weedy check (215.03 q/ha). The different treatments did not have significant effect on cane quality attributes.

CHEMICAL WEED CONTROL IN CUMIN

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Six herbicides namely, fluchloralin, nitrofen, methabenzthiazuron, oxadiazon, benthiocarb and oxyfluorefen were evaluated along with weed free condition and unweeded check in cumin crop on medium black soil at College Fram of Gujarat Agricultural University, Junagadh during 1981 to 1983 in rabke season. Among the herbicides tried in experiment, fluchloralin 0.9 kg ai/ha (pre plant and pre emergence), oxadiazon 1 0 kg ai/ha (pre emergence), benthiocarb 2.0 kg ai/ha (pre emergence) and oxyfluorefen 0.48 kg ai/ha (pre emergence were found effective in checking weeds growth (71.5, 73.3, 83.2, 70.3 & 75.3 per cent WCE, respetively) and produced grain yield comparable to weed free condition, in pooled results. Unweeded check recorded significantly the lowest grain yield (251 kg/ha) and was at par with methabenzthiazuron 1.4 ai/ha (pre emergence). Weed free condition (frequent manual weedings) although recorded the highest grain yield but found uneconomical as compared to herbicides tried in the experiment. Oxadiazon 1.0 kg ai/ha as pre emergence found most economical and effective in weed control, too.

STUDY THE EFFICACY OF HERBICIDES FOR WEED CONTROL IN ISABGUL (Plantago ovata Forsk.)

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The cultivation of Isabgul on a commercial scale in India is restricted to North Gujarat and some part of Rajasthan located on the out skirts of the adjoining North Gujarat. Looking to its potential in the market farmers are more inclined to grow this crop in middle Gujarat. Broadcasting of seeds on flat beds is a common practice for raising this crop. The interculturing is not possible and other operations are also difficult. Under such circumstances herbicidal control of weeds deemed essential if found effective without

having any injurious effects on crop plants. Therefore study was conducted to investigate the efficacy of herbicides with appropriate time of application for weed control in Isabgul.

The results of two years (1982-83 and 1983-84) data indicated that effect of herbicides were significant. In Pooled analysis also the effect of herbcides found significant. Among herbicides Chloramben (amiben) and Pendimethalin (Stomp) found injurious to crop plants whereas Isoproturon (Taurus 50) found conductive. Pre-sowing and pre-emergence application of Isoproturon at lower rate (0.5 kg ai/ha) found superior over higher rate (1.0 kg ai/ha). The pre-sowing or pre-emergence application of isoproturon was at par with one or three hand weeding treatments.

Looking to the net ICBR it was apparent that pre-sowing and pre-emergence application of isoproturon at 0.5 kg ai/ha had the net ICBR of 1: 26.66 and 1: 26.62 respectively compared to 1: 20-23 of hand weeding (30 days after sowing). Three hand weedings were not economical.

A TOLERANCE OF JAPANESE MINT (Mentha arvensis L.) TO VARIOUS HERBICIDES

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Preliminary herbicides screening trial for Japanese mint showed good post-emergence tolerance to Sinbar (Terbacil), Fusilade and Prapanil (Stam F 34). Oxyfluorfen (Goal), Oxadizon (Ronstar), Pendimethaline (Stomp), Treflan (Trifluralin). Paraquat (Gramoxone) and Propanil + Paraquat, however, showed prohibitive phytotoxicity to the crop when used as post-emergence herbicide. Pre-emergence tolerance was found with an even greater reange of herbicides viz., Sinbar, Oxyfluorfen, pandimethaline, Oxadiazon, Diuron (Karmex), Treflan and Fluchloralin (Basalin).

As pre-emergence application Sinbar, Oxyfluorfen, Treflan, Pendimethaline, Oxadiazon and Diuron controlled 70-95% of the existing weed population and thus found to be highly promising.

CHEMICAL WEED CONTROL IN GERMAN CHAMOMILLE (Matricaria chamonilla L.)

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LUCKNOW-226 016.

Six pre-emergence herbicides (Chloramben, oxyfluorfen, benthiocarb, butachlor, nitrfen and alachor) alongwith weedy and weed free check were evaluated in German Chamomille (Matricaria chamomilla L.) during winter of 1980-81 at Central Institute of Medicinal and Aromatic Plants, Lucknow. Oxyfluorfen 0.5 kg ai/ha gave maximum weed control efficiency (98.5%) and produced flower yield at par to weed free check. Benthiocarb and nitrofen were also selective to German chamomille but did not give desired weed control.

RELATIVE EFFICACY OF ORGANIC MULCH AND HERBICIDES

RELATIVE EFFICACY OF ORGANIC MULCH AND HERBICIDES FOR WEED CONTROL IN CYMBOPOGON SPECIES

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Herbicides (Simazine, atrazine and 2 4-D each at 1.5 kg ai/ha, diuron 0.75 and 1.5 kg ai/ha, oxfluorfen 0.5 kg ai/ha an diuron 0.75 + 2,4-D 0.75 kg ai/ha) and organic mulch (distilled Citronella Java herb 5 t/ha) were compared with conventional method (3 spade hoeings/year), weedy and weed free check during 1981-82 and 1982-83 in three cymbopogon species: Citroneela Java **(Cymbopogon wenterianus)**, lemongrass **(C. flexuosus)** and plamarosa **(C. martinii)** under the agroclimatic conditions of central U.P. Unchecked weed growth caused 50.0 and 17.3% reduction in herb yield in first and second year, respectively. Organic mulch, simazine, diuron (1.5 kg ai/ha) and oxyfluorfen were equally effective in checking weed dry matter and gave at par herb and oil yield to weed free check. However, organic mulch, with no purchase cost, found to be most competative amongst weed control measures. Palmasrosa, followed by lemongrass had better weed suppression potential that Citronella Java.

EFFECT OF CERTAIN HERBICIDES ON CONTROL OF WEEDS AS WELL AS GROWTH AND YIELD OF ALFALFA (Medicago sativa).

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To evaluate the effects of Eptam, Kerb, Diuran, Dalapon, Amotrola, Gramoxone and MCPB for controlling weeds in Alfalfa (Sirsa-9) alongwith their effects on growth and yield, an experiment was conducted during rabi 1972 at Anand. Each herbicide was tested as pre-and post-emergence application keeping the level same. Amongst herbicides kerb significantly reduced total number of weeds as well as dry weight of weeds as compared to the remaining herbicides. Weeded control appeared to be superior in respect of controlling total number of weeds and dryweight. Weeded control significantly increased green forage yield over unweeded control and herbicides except eptam and Kerb. The methods of application were significant, in general in favour of pre-emergence application. The interaction effect of herbicides methods was significant, such that pre-emergence application was significantly superior over post-emergence application in case of Eptam, Kerb, Amitrole, and Gramoxone. Amitrole 2/ha as pre-emergence application gave significantly higher seed yield of lucerne over rest of the treatments.

EFFECT OF NITROGEN AND CUTTING—STAGES ON WEED GROWTH IN DEENANATH GRASS (Pennisatum pedicellatum TRIN)

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Effect of four levels of nitrogen (0. 40, 80 and 120 kgsN/ha) and three cutting stages (early boot, flag

leaf and 50% flowering) were Stuided on weed growth in two varieties of **Pennisatum pedicellatum** Trin (JP-1 and Type-15). The studies revealed that the weed growth was significantly the lowest under higher nitrogen levels as compared to no nitrogen, which was attributed to the greater vigour of **Pennisatum pedicellatum** Trin which suppressed the weed growth. The weed growth was suppressed to the greater extent and the lowest weed biomass was noted when cutting was done at 50% flowering stage as compared to the earlier cuttings. The variations due to varieties were non significant.

The weeds of the experimental field consisted of **Aeschynomene indica, Ageratum Conyzoides, Corchorus, Spp., Eclipta abla, Leucas asperct, Mollugo Spp.** and **Saccharum Spontaneum.**

EFFECT OF DIFFERENT METHODS OF WEED CONTROL ON YIELD AND QUALITY OF FORAGE Sorghum

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TIKAMGARTH-472 001 (M.P.)

The influence of atrazine @ 0.75 and 1.50 kg/ha both applied as pre + post, 3 hand weedings and varieties (JS-20, PC-6, S-136) was studied on weed control in forage **Sorghum.**

The dominant weeds consisted of Cyperus spp., **Cynodon dactylon** Pers., **Eleusine indica** (L.) **Gurth, Echinochloa crusgalli** (L.) Limk, **Ageratum conyzoides** L., **Caesulia axillaris, Eclipta alba Musk** and **Corchorus acutangulus** L. Hand-weeding followed by atrazine @ 1.50/ha provided and excelent control of wide range of weed species. Increased weed competition significantly reduced the nutrient uptake by crop and resulted in lower yield. Hand weedings was found most profitable followed by atrazine @ 1.50 and 0.75 kg/ha as compared to unweeded control.

The effects of varieties on weed emergence at different stages nonsignificant but significantly lower weed dry matter was noted under variety JS-20 and it had higher weed competitive ability and produced greater grain yield. The stover yield was higher in S-136.

NUTRIENTS UPTAKE BY FORAGE SORGHM AND WEEDS AS AFFECTED BY HERBICIDES

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Four herbicides vize; Abrazine, Simazine, Diuron and Dichlormate each at 0.5, 1.0 and 2.00kg ai/ha were tested under two varieties of forage sorghum i.e. M.P. chari and Vidisha 60-1. The Vidisha 60-1 took up significantly higher amount of N, P2O5 K20, Fe, Zn, Mn and Cu as compared to M.P. Chari. Atrazine and Simazine each at 1.0 and 2.00 kg ai/ha and hand weeding provided weed free environment for both the varieties of forage Sorghum till cutting (at 50% flowering). Weed free forage Sorghum removed 128.84 N,

27.50 P_2O_5 and 172.10 K_2O kg/ha besides 2694, 392.27.505.7, 115.5 gm/ha each Fe, Zn, Mn, and Cu respectively. Associated weeds when permitted to compete till cutting of forage Sorghum depleted 48.58 N, 21.96 P_2O_5 and 45.21 K20 kg/ha in addition to 413.78, 47.62, 95.94 and 17.28gm/ha of Fe, Zn, Mn, and Cu respectiely. Atrazine treated @ 1.0 and 2.0 kg ai/ha under both the varieties removed significantly higher quantity of N,P_2O_5 and K_2O and less amount of these nutrients by the associated weeds as compared to all other tratments. Interaction between varieties and weed control treatments for uptake of Nutrients by crop and weeds were significant.

Further, interaction effect under harbicides and their different levels, Weeded and un-weeded regarding uptake of plant nutrients by crop and weeds were also found significant.

BIO—EFFICACY OF DIFFERENT HERBICIDES FOR CONTROLLING WEEDS IN PEARL—MILLET FOR FODDER PRODUCTION.

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Efficacy of atrazine, simazine, linuron, terbutryn and cynazine (0.25 & 0.50 kg/ha), pendimethalin and dinitramine (0.50 & 0.70 kg/ha) was compared with two hoeings and no-weeding for weed control in pearl-millet for fodder at the Punjab Agricultural University, Ludihana during kharif 1981 and 1982. All the herbicidal treatments (except linuron 0.25 kg/ha durino 1981) casued significant reduction in dry matter accmulation by weeds as compared to no-weeding. Atrazine 0.50 kg/ha affected complete weed free condition in both the years.

Atrazine 0.25 and 0.50 kg/ha yielded significantly higher green fodder as compared to no-weeding and were at par with two hand hoeings. The effect of other herbicidal treatments was inconsistant. Simazine (0.25 & 0.50 kg/ha) and terbutryn (0.25 kg/ha) in 1981 and cynazine (0.25 kg/ha), pendimethalin and dinitramine (0.50 & 0.75 kg/ha) in 1982 affected significantly higher green fodder production. Higher doses of herbicides had phytotoxic effect on the crop in 1982 because it rained immediately after application of herbicides. During this year the toxic effect was maximum in linuron (0.50 kg/ha) and this treatment resulted in 63 q/ha green fodder yield against 345 q/ha in no-weeding.

These data indicated that atrazine 0.25 kg/ha gave an effective control of weeds and produced fodder yield at par with two hand hoeings.

HERBICIDAL WEED CONTROL IN CUMIN (Cuminum cyminum)

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Cumin is broadcasted for sowing the crop. Therefore interculturing is not possible. Weeding through manual labour is the traditional system for checking weeds. For testing the efficacy of herbicides

the experiment was under taken at College Agronomy Farm of Gujarat Agricultural University, Anand, during the year 1983-84 in loamy sand soil. In the experiment two herbicides viz. Isoproturon. 1.0 and 2.0 kg ai and Oxyfluorfen 0.125 and 0.250 kg ai were tested.Herbicides were applied at three different times viz. Pre-sowing, pre-emergence and post-emergence stage. Result showed that Oxyfluorfen at 0.250 kg ai/ha as pre-sowing application (546) yielded highest compare to other treatments. However, it was at par with two hand weeding (535 kg).

STUDY TO FIND OUT EFFECTIVE METHOD OF WEED CONTROL IN BIDI TOBACCO

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Several interculturing in bidi tobacco is a common practice followed by farmers. Under such circumstances it was imperative to test efficacy of herbicides for weed control without injuring the crop. Studies were carried out on College Agronomy Farm of Gujarat Agricultural University. Anand, during the year 1983-84 on loamysand soil. Three herbicides, benthiocarb (0.750 kg ai/ha), Oxyfluorfen (0.100kg ai/ha) and fluchloralin (1.5 kg ai/ha) with interculturing (1 intrculturing and 4 interculturing) were tested. The results revealed that the highest yield of cured leaves (2696) was found in hand weeding. This was at par with fluchloralin + 4 interculturing, benthiocarb + 4 interculturing and Oxyfluorfen 1 and 4 interculturing The Orobanche population reduce the tobacco yield to the tune 15.17 per cent.

WEED COMPETITION PROBLEMATIC WEEDS AND AQUATIC WEED CONTROL

CROP—WEED COMPETITION STUDIES IN DRILLED RICE

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Critical period of crop-weed competition in drilled rice under unpuddled condition was studied during rainy season from 1981-1983. **Echinochloa colonum, Scrpus grossus, Dactyloctenium aegyptium, Cyperus rotundus, C. iria** and **Trianthema monogyna** were the major weed species.

Competition with weeds during the first 15 days or sowing had no significant effect on the grain yield of rice. Competition beyond 15 days of sowing caused drastic reduction in the grain yield. There was significant increase in the grain yield with the increase in the duration of weed-free period upto 45 days after sowing. However, further increase in the weed-free period could not cause much increase in the grain yield. Weeds that emerged after 45 days after sowing were less in number and theri growth was suppressed by the crop. Weeds emerging 15 or 30 days of sowing were high in density and could compete with the crop resulting in reduced grain yields. These observations required a weed-free period during 15 to 45 days after sowing.

CROP—WEED COMPETITION IN MAIZE AND ITS CONTROL IN SIKKIM.

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The major weedflors of the maize fields consisted of **Echinocloa criqulli, L., Echinocloa coloum, L., Eleusine indica, L., Cyperus rotandus, L., Cynodom dectylon, L., Ageratum conzoids, L.** and **Setaria glauca, L.** With a distribution varying from 5.33% and were found to reduce the grain yield significantly. The crop-weed competition experiment revealed that weed free condition through interculturing and hoeing upto 60 days afte sowing increased the maize grain yield by 69% Two handweeding (25 & 50 DAS) and application of simazine @ 2.0 kg ai/ha were found to be statiscally significant and economically viable treatment giving an increase of 61.00 and 49.99% in maize gain yield and a net profit of Rs. 1902.00 and Rs. 1967.00/ha over control respectively. Minimum weed drymatter and number of weeds/sq. metre were observed in two handweeing (25 & 50 DAS) treatment. Different growth and yield characters like plant height, number of plants/plot and number of cob/plot in two handweeding treatment increased significantly.

WEED OCCURENCE AND COMPETITIVENESS AGAINST TWO RICE CULTIVARS AS AFFECTED BY METHOD OF PLANTING AND WEED MANAGEMENT

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Density and dry matter production of weeds was significantly more under broadcasting method as compared to transplanting method of cultivation. Important associated weeds include Cyperus difformis **Cyperus iria, Cyperus esculentus, Scirpus ereutus, Echinochloa colonum, Brachairia multica Paspalum Paspalodes, Ammania baccifera, Caesulia axillaris** and **Margilea quadrifoila.** Sedges dominated the weed fora and accounted for 62% of total weed population in control

plots. Loss in grain yield to weed competition under nonweeded conditions was more in broadcasting method (49.9%) compared to transplanting method of cultivation (40.5%). Cultivar Tellahamsa smothered the growth of weeds, resulting in less density and dry matter production of weds, when compared to IR-50. Highest weed control eficiency was achieved with hand weeding in both methods of rice cultivation. Under broadcast situation it was followed by Fluchlora lin + 2,4-D E .E. and Fluchloralin alone which were superior to Oxadiazon and Pendimethalin gave excellent control of weeds and were on par with that of hand weeding.

STUDY ON COMPETITION BY BARNYARD GRASS (Echinochloa crusgalli (L.) Beauv.) IN RICH HILLS

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In the kharif 1984 an experiment was undertaken to study the competition offered by barnyard grass in rice (**Oryza sativa** L. cultivar Bala) hills at different levels of nitrogen. Rice and barnyard grass seedlings were transplanted in different proportions, viz. 5 rice + no barnyard grass, 4 rice + 1 barnyard grass and 3 rice + 2 barnyard grass seedlings per hill. Nitrogen levels were 60, 120 and 180 kg/ha. While there was a trend in the effect of different nitrogen levels on the plant growth of either species, especially on barnyard grass, no signficant relation could be established. Barnyard gras, irrespective of numbers, reduced tiller count (23.9%) and dry weight (23.2%) of rice at 70 days after transplanting (DAT) as compared to the pure rice stand. There was 20.2% and 37.5% reduction in grain yield of rice when 1 and 2 barnuard gras seedings were present in hills, respectively. The straw yield of barnuyard grass was significantly higher when 2 seedlings of barnyard grass were present in hills. There was no significant difference in the plant height, tiller count, and dry weight of barnyard grass, at 70 DAT when 1 or 2 barnyard grass seedlings were present in hills.

STUDY OF WEEDFLORA, CROP WED COMPETITION AND CHEMICAL WEED CONTROL FOR WHEAT IN SIKKIM.

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Field studies were conducted at ICAR Research Complex Farm Tadong during rabi season of 1980-81 and 1981-82, to find out the influence of weedree maintanance and relative effectiveness of some broad spectrum herbicide namely 2,4-D Na Salt, weedone conc.48 and tribunil in wheat. The major weedflora of the experimental plots were **Polygonum capitata, L., Cyparus rotandus, L., Chenopodium album, L., Amaranthys viridis, L.** and **Phalaris minor Ratz.** Maximum weed population and weed drymater were observed in unweeded in both the experiments. Weedfree maintanance study revealed that maximum grain yield (50.68 q/ha) was obtained, when plots were kept weedfree till harvest followed by

weed free till 60 DAS (47.95 q/ha) and found significantly superior over other treatment with an percentage increase of 43% and 35% respectiely. Cultural cum chemical weed control experiment revealed that maximum grain yield (29.96 q/ha) was obtained, when tribunil was applied @ 1.5 kg ai/ha followed by two handweeding (27.41 q/ha) with an increase of 29.30% and 18.30% respectively. Tribunil gave a not monetary return of Rs. 1190.50 over control and found economical over all other treatments.

CRITICAL STAGES OF CROP WEED COMPETITION IN TRANSPLANTED FINGERMILLET

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A filed experiment was conducted during Summer 1977 and Kharif 1978 to determine the critical stages of crop weed competition in tranplanted fingermillet. The treatment in this experiment consisted of allowing the weeds to grow with transplanted fingermillet for 2, 3, 4, 5, 6, 7, 8 and 9 weeks after transplanting. There after the crop was kept weed tree throughout the crop growth period. The grain yield was maximum when the plots were kept weed free throughout crop growth period (3475 kg/ha in 1977 and 3536 kg/ha in 1978). To get higher yield the plots should be kept weed free for about 6 to 7 weeks after transplanting.

STUDIES ON CROP—WEED COMPETITION IN IRRIGATED UPLAND DRILED RICE (Var. prabhavati)

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Field experiment was carried out to find out the crop-weed competition in upland drilled rice during Kharif season of 1982-83. Treatments consisted of various duration of weedy and weed free conditions for the first 15,30 and 45 days after sowing with two controls viz- weedy and weed free upto harvest. Major weeds were **Denebru** sp.; **Cynodon dactylon**; **Abutilon indicum**; **Digera arvensis**; **Corchorus actuangulus** and **Parthenium hysterophorus.** Results indicated that association of weeds for the entire crop season caused 48.76% yeild feduction Weed free upto harvest gave highest grain yield and was at par with keeping the plot free of weeds upto 30 and 45 days after sowing and these treatments gave significantly higher grain yield over the treatments weed free upto 15 days and weedy upto harvest. Thus the critical period for crop-weed competition in upland drilled rice lies in between 15 nd 30 days after sowing.

WEED CROP COMPETITION IN RICE (Kharif transplanted) AND WHEAT CROPS IN LATERITIC BELT OF WEST BENGAL

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Field experiments were conducted on the Agricultural Farm at the Institute of Agriculture, Visva-

Bharati University, Sriniketan, India in both the **kharif** and **rabi** seasons during 1978-79 to 1981-82 to study the weed crop comptition in rice and wheat crops in the lateritic belt of West Begal. In this experimental situation, the competition offered by broadleaved weeds was very high followed by grases and sedges respectively in both rice and wheat crops. In rice crop, unhampered growth of weeds (unweeded control) removed 4.50 Kg N, 1.87 Kg P_2O_5 and 6.85 kg K_2O per hectare at 60 days after transplanting, while in wheat crop nutrient removal by weeds when allowed to grow undistrubed was as high as 19.64 Kg N, 2.62 Kg P_2O_5 and 26.70 Kg K_2O per hetare. Losses in grain yield due to unhampered weed competition was 33.39 to 38.35 per cent in wheat and 25.8 per cent in transplanted **kharif** rice crop.

As regards the effectiveness of treatments, in case of rice crop, though 2,4-D EE 1.0 Kg was found to be the most effectie to check the weed growth, it could not produce highest yield increase because of its temporary toxic effects on crop plants, immediately after application, while 2,4 D IPE 1.0 Kg at five days after transplanting showed highest yield increase (38.28 per cent). In wheat experiments in all the three years, methabenzthiazuron 1.5 Kg at one day after sowing proved to be the most effective against weeds and recorded highest increse in yield over unweeded control to the range of 50.14 to 62.22 per cent.

STUDIES ON CRITICAL PERIOD OF WEED COMPETITION IN UPLAND RICE IN HILLY TERRAINS OF MEGHALAYA

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ICAR Research Complex for NEH Region,
SHILI ONG

Experiment conducted on upland rice grown on hilly terrains at ICAR Research Complex Fram, Barapani (Meghalaya) during 1983 and 1984 revealed that period from 20 to 40 days after sowing was most critical for crop weed competition and economic threshold levels of weeds. Removal of weeds at 20 and 40 DAS did not differ significantly in respect to grain yield. With the delay in weeds removal after 40 DAS, the yield of grain reduced drastically, which corresponded adversely with the accumulation of weed dry matter.

CRITICAL PERIOD OF CROP—WEED COMPETITION IN GUAR (Cyamopsis tetragonoloba (L) Taub)

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Field trials were conducted at the Centre for Research in Arid and Semi-arid Zone Problems, Gujarat Agricultural University, SardarKrushinagar during Kharif 1982 and 1983 with a view to find out the critical period of guar-weed competition, so that crop may be saved from the damaging effect of weeds by taking effective weed control measures. Weeds offered great competition to guar crop and thus reduced the yield ranging from 70 to 98 per cent. From the two years data, it apeared that the most critical period of crop weed competition in this crop was 20 to 50 days after seeding. This is based on the data on grain yield and the dry matter accumulated by the weeds.

CROP—WEED COMPETITION STUDIES IN MUNGBEAN (Vigna radiata)

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Crop-weed competition studies were carried out during rainy seasons from 1980-82 to find out critical period of weed control in mungbean. The maior weed species in the experimental field were **Echniochloa colonum**, **Dactyloctenium aegyptium**, **Eleusine indica** and **Digitaria sanguinalis**.

Weeds caused 75.5% reduction in the grain yield when competed with the crop during the entire crop season. Increase in the duration of competition from 15 days after planting to haresting resulted into increased losses of grai yields. Crop-weed competition during first 45 days caused 55.2% reduction in grain yield. Competition after 15 days caused 49.5% reduction in grain yield whereas competition after 30 days of planting had no much adverse effect on the crop. Weed-free condition mentained beyond 30 days of sowing had no beneficial effect on the crop. On an average, weed-free condition mentained for the first 30 days produced grain yields at par with weed-free for the entire crop season.

CROP—WEED COMPETITION STUDIES IN GRAM (Cicer arietinum L.)

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Crop-weed competition studies in gram were carred out during winter seasons from 1980-81 to 1981-82 to find out the critical period of weed control. Grain yield of gram due to uncontrolled weeds was reduced by 50.8%. Loss in grain yield due to competition with weeds increased with increase in the duration of weedy condition. Weedy condition during first 30 days caused 22.8% reduction in grain yield whereas weedy condition for the first 90 days caused 46.0% reduction. Grain yield increased with increase in the period of initial weed-free condition upto 60 days of sowing. Weeds that emerged 30 days after sowing could cause 26.3% reduction in the grain yield. These observatons revealed that the crop required an initial weed-free period of 60 days.

CROP WEED COMPETITION IN SUMMER GROUNDNUT

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The results showed that pod yield, fodder yield, number of developed pods per plant, test weight and total dry weight of weeds were signficantly influcenced due to various treatments. Signficantly the highet pod yield (22.10 q/ha) was obtained in weed free condition upto harvest but it was at par with weed free condition upto 45, 60 and 75 days from sowing. Almost similar trend was observed in case of fodder yield, number of developed pods per plant and test weight (weight of 100 kernels). Signficantly the lowest pod yield (13.89 q/ha) was recorded in unweeded control, however it was at par with weed free condition after 30, 45, 60 and 75 days from sowing. Almost similar trend was observed in other characters. The pod yield number of developed pods per plant and test weight due to weed free upto 4 days was significantly high compared to wed free after 45 days from sowing. Further the lowest (21.3 g/m^2) and the highest (151.4 g/m^2 total dry weight of weeds was recorded in weed free upto harvest and unweded control, respectively. Similarly weed free condition upto 45 days recorded significantly low dry weight of weeds (31.1 g/m^2) compared to weed free afte 45 days (103.2 g/m^2).

Weeds smothered groundnut crop under unweeded control and almost similar effect observed under weed free conditions upto 15 days and freedom from weeds after 30, 45, 60 and 75 days. It was found that the critical weed free period for groundnut was upto 45 days from a sowing under a spacing of 30 cm between two rows out of a crop duration of 110 days.

CROP WEED COMPETITION STUDIES IN MAIZE INTERCROPPED WITH SOYBEAN

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Field studies were carred during **Kharif** 1982 to determine the most critical period of weed competition in maize intercropped with soybean in different proportions and geometry. Six intecropping patterns (C1-Soild maize, M; C2 -Soild soybean S; C3-M + S, 1:1, C4-M + S, 1:2, C5-M + S, 2:2 with normal spacing of maize, and C6-M + S, 2:2 with 45-75 cm row spacing of maize and accomodating 2 rows of soybean in between 2 rows of maize with increased spacing) were kept weed free for 15 30, 45 and 60 days after sowing alongwith an unweeded check

Treatment having maize intercropped with soybean in 1:1 ratio with the normal row spacing of main crop resulted in hghest maize yield and Maize Equivalent Yield (MEY). Although differences in maize yield were not significant, but C3 proved significantly superior to all but C6 intercropping patterns in terms of MEY. The yield of soybean decreased substentialy and signficantly when intercropped with maize.

Keeping weed free conditions upto 30 days after sowing (DAS) significantly increased the yield of maize and soybean and Maize Equivalent Yield (MFY) although the reduction in weed weight was

significant when plots were kept weed free upto 45 DAS. This indicates that a period of first 30 days after sowing is critical from weed competition point of view in maize alone or intercropped with soybean in different proportions.

CROP WEED COMPETITION IN UPLAND BUNDED RICE

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Crop weed competition experiment was conducted in upland bunded rice (var.) T K.M.9 at TNAU, Coimbatore during 1984. Seed rate adapted was 100 kg/ha. The treatments were maintaining weed free condition from 0.20 (20), 0-40 (20 and 40), 0-60 (20, 40 and 60) and weed infested condition upto 20, 40 and 60 days after sowing and unweeded control. Weeds were removed by hand. Annual grass weed Echinochloa colonum consistuted 90 percent of the total weed population and reduced the grain yield cent per cent. Maintaining weed free condition from 0-20 days was similar to unweeded control. Alowing weed infestation upto 20 days from sowing did not reduce the grain yield as compared to 40 and 60 days indicating the critical crop weed competion period was between 20 and 60 days from sowing. The required weed free condition can be maintained by giving three weedings at 20, 40, and 60 days after sowing which recorded the higher grain yield.

STUDIES ON CROP—WEED COMPETITION IN RAINFED COTTON (SRT—1) UNDER MARATHWADA CONDITIONS.

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Field studies were conducted during **kharif** 1982-83 so as to find out the critical period of weed competition in rainfed cotton at Marathwada Agril. University, Parbhani, Treatments consisted of various duration of weedy and weed free conditions for the first 20.40, 60 and 80 days after sowing with two controls viz- weedy and weed free upto harvest Predominant weeds were **Corchorus acutangulus; Argemone maxicana; Acalypha indica; Euphorbia hirta Cynodon dactylon; Denebru** sp and **Cyperus rotundus.** When the weeds were allowed to grow for the entire crops season, these was 53.58% reduction in seed-cotton yield. Keeping the plot weed free upto 60 days resulted in maximum seed-cotton yield (1947 kg/ha) and was significantly superior to the plots kept free of weeds upto 20 days and weedy upto days after sowing. Weed association upto 20 days had no adverse effect on seed-cotton yield. Similarly keeping the plot free of weeds beyond 60 days did not prove beneficial. Thus, the critical period for weed control in rainfed cotton under marathwada conditions lies in between 20 and 60 days after sowing.

STUDIES ON THE CROP-WEED COMPETITION IN CUMIN (Cuminnum cyminum L.)

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Gujarat is the principal state for cumin seed production. The crop is broadcasted hence, weeding operations are cumbersome and time consuming. The availability of labourer at propr time of weeding also a problem to the farmers. So, the cost involved in weeding should be payable to farmers. For this purpose the knowledge of critical period of crop-weed competition may found helpful. This would also helpful particularly when only one weeding operation is to be carried out. The presence study, therefore was undertaken to study the critical period of crop-weed competition in cumin crop.

The results of both the years (1983-83 and 1983-84) indicated that differences between weedy and weedfree condition were significant. Among the weedy treatments 15 and 30 days were significantly differed. In case of weed free treatments, keeping the plot weed free upto 45 days found useful. However, net ICBR values indicated that period upto 30 days after sowing if kept weed free, then the ICBR value reach upto 1:10.5. Thus, it was indicated that if one weeding is to be carried out then it should be between 15 and 30 days. If two weedings are to be carried out then they should be on 15th and 30th days after sowing.

CHEMICAL CONTROL OF TYPHA ANGUSTIGOLIA

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Typha grass which is commonly known as cattails is the most obnoxious weed among other aquatic weeds. It propagate very fast in aquatic habitats such as slow-moving shallow water, low banks of fresh water ponds, lakes, rivers, canals, ditches and water-logged fields. It reduces the flow of water in canals and drainage ditches. Different control measures have been used to control the growth of typha spps. In the present study a trial was conducted to study the growth of typha spps in slow-moving water and to test the efficiency and economics of few of the weedicides on mortality of typha spps.

EFFECT OF WATER DEPTH ON LIFE CYCLE OF THE AQUATIC ALGAL WEED CHARA

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Three experiments were designed under green house condition to note the influence of water depth

on the germination capacity, nature and rate of growth of two Chara species (Viz. **C. Zeylanica** Klein Ex. Willd and **C. fibrosa** Ag. Ex. Bruz). It was noted that while germination capacity remained unnfluenced by the levels of water, the biomass accumulation was adversely affected however. This was primarily because the level of water from 5cm to 100cm had a limiting influence on the apical growth of the algae and thus indirectly affecting the biomas. The implication of such study in the partial control of this algal weed through water level manipulation has been pointed out. It has also been envisaged that this would otherwise facilitate herbicide and fertilizer application too.

EFFECT OF CONTACT PERIOD OF HERBICIDES IN KITTLING HYDRILLA AND WATER HYACINTH

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With an idea of finding out the minimum period of canal closure, where sun drying is not possible, the plants of hydrilla and water hyacinth were sprayed with 2.4-D, paraquat and diuron, and were transferred in fresh water after a period of 1, 2, 3, 4, 5, 6, 7, 8 and 10 days. Paquat was very quick in action in killing hydrilla because at 1.0 ppm concentration it required only 2 days during May and 3 days of contact period during September for complete kill of plants. Diruon at 2.5 and 5.0 ppm concentration was found to be slow in action as it required atleast 5 days of contact period for sufficient absorption, whereas 2,4-D at 2.5 and 5.0 ppm concentration required a minimum of 4 days contact period. Regarding water hyacinth, 2 kg ai/ha during May and September was sufficient in killing the plants completely. Praquat could not kill the water hyacinth plants at 0.2 and 0.4 kg ai/ha doses whatever the period of contact might be.

EFFICACY OF STOMP BROAD SPECTRUM HERBICIDE IN THE CONTROL OF Phalaris minor AND OTHFR WEEDS OF WHEAT IN IDNAI—A REVIEW

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STOMP pendimethalin, a selective dinitroaniline herbicide discovered and developed by American Cyanamid Company effectively controls a wide spectrum of annual grasses and broad-leaved weeds in many agronomic and horticultural crops. STOMP acts by inhibiting early seedling development of suceptible weed species which die shortlyafter oermination of folowing emergence from the soil. STOMP has been extensively tested in India in the control of **Phaaris minor** and other weeds of wheat. The product has also been successfully evaluated in the control of weeds of rice, cotton, potato, onion, cumin, chickpea, soybean and groundunt in India. Presently, STOMP is under extensive field testing in many crops.

In a series of experiments conducted during the past several years. STOMP showed outstanding

performance in the control of **Phalaris minor** and other weeds of wheat and gave significantly higher yields. In multi-location trials conducted under the All India Coordinated Wheat Improvement Project during 1980-81 and 1981-82, STOMP 30% EC @ 1.0 kg ai/ha applied within 2 days of sowing of wheat gave excellent control of **Phalaris minor** and other weeds with corresponding higher yields in comparison to the existing wheat herbicides.

In this paper, the magnitude of weed problem in wheat with partcular reference to **Phalaris minor** along with the highlights of work done on the efficacy of STOMP against these weeds is presented and discussed.

CONTROL OF Echinochloa crusgalli WITH HERBICIDES IN RICE NURSERY

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Echinochloa crusgalli, Beauv. is an important weed in rice nurseries of coastal Andhra Pradesh In view of its similar characters to that of rice seedlings during its earlier growth it is very difficult to control it by manual labour. Hence a field trial was laidout in split plot design with dates of spraying as mainplot treatments (3rd and 7th day after sowing) and herbicides as sub plot treatments. The herbicides included in the trial are, benthiocarb at 1.87 kg and 2.5 kg/ha, butachlor at 2.0 kg/ha and oxyfluorfen at 0.15 kg/ha comparing with unsprayed control, Rice variety under test is 7029 (Swarna). The rice seeds were mixed with **Echinochloa crusgalli** seeds at the time of sowing and are uniformly broadcasted in the experimental plots. The periodical weed counts of **Echinochloa crusgalli** at 10th, 20th and 30th day after sowing indicated that the herbicides sprayed at 3rd day after sowing is significantly superior over 7th day after sowing in respect of weed counts, though there are no significant differences on dry weight ofweeds and dry weight of paddy seedlings. The herbicide oxyfluorfen at 0.15 kg/ha and benthiocarb at 2.5 kg/ha were signficantly superior over the rest of the treatments at all the three dates of weed counts. The lowest total dry weight of weeds was recorded with oxyfluorfen at 0.15 kg/ha, followed by benthiocarb @ 2.5 kg/ha which was significantly superior over benthiocarb at 1.87 kg/ha and butachlor @ 2.0 kg/ha. Significantly maximum dry weight of weds was recorded in unsprayed control plot over all the herbicide treatments. Maximum dry weight of rice seedlings was recorded with benthiocarb at 2.5 kg/ha followed by the same herbicide at 1.87 kg/ha and butachlor at 2.0 kg/ha which were significantly superior than oxyfluorfen and unsprayed control plot. Hence the herbicide benthiocarb at 1.87 and 2.5 kg/ha and butachlor at 2.0 kg/ha on 3rd day after sowing is preferable for the control of **Echinochloa crusgalli** in rice nursery raised under upland conditions.

STRIGA EMERGENCE AND GRAIN YIELD OF SORGHUM AS INFLUENCHED BY DIFFERENT GARDED DOSE OF NITROGEN IN VARIOUS SORGHUM CULTIVARS

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A field trial was conducted during **kharif** season of 1984 to findout the effect of nitrogen doses on the striga emergence and grain yield of sorghum. Treatments consisted of two sorghum cultivars i.e. CSH-1 & PVK-86 with four nitrogen doses i.e. 0,50,100 & 150 kg N/ha. The experiment was framed in the F.R.B.D. design with four replications. The dominant weeds besides striga, were **Sonchus arvensis, Phyllanthus medraspatensis, Alysicarpus rugousus. Corchors acutangulus** and **Vicoa indica.** Studies revealed that striga population was significantly lower in PVK-86 than CSH-1 at all the stages of observations. The striga population/sqm was axmum at 90 days i.e. (7.92) in CSH-1 & (6.63) in PVK-86 and least at 60 days i.e. (1.45) in CSH-1 & (0.42) in PVK-86. The striga population decreased numerically with the increase of the nitrogen doses. However, the differences in striga counts were non-significants. Grain yield was significantly higher in PVK-86 (1497 kg/ha) than CSH-1 (1236 kg/ha). Application of nitrogen @ 100 and 150 kg/ha recorded signficantly higher grain yield over control, However, the differences between 50,100 and 150 kg N/ha were non-significant.

EFFECT OF ETHREL, NITROGEN AND HERBICIDES ON CONTROL OF STRIGA IN SORGHUM

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Effect of ethrel (1,2 and 3 L per ha), nitrogen and herbicides (2,4-D, Diuron and Chloramben) on control of **Striga** in two sorghum genotypes (cv CSH-8R and cv. 5-4-1) ws studied under rainfed conditions at Bijapur during **rabi** 1979-80. The population counts of **Striga** recorded at 60, 80 and 100 days after sowing and at harvest revealed significant differences among the treatments. Cultivar CSH– 8R was more suceptible for **Striga** as compared to cv. 5-4-1. Application of 100-25 N-P2O5 kg per ha and post emergence application of 2,4-D at 1 kag per ha recorded significant reduction in **Striga** population counts, while application of ethrel although reduced **Striga** counts as compared to unweeded check, yet the **Striga** counts were significantly higher as compared to hand weeding treatment. The dry weight of **Striga** was significantly higher in cv. CSH-8R (25.2 g/pot of 4.32 M^2) than in cv. 5-4-1 (4.5 g/plot of 4.32 M^2). Further, application of 100-25 N-P_2O_5 kg per ha, 2,4-D at 1 kg per ha has recorded significant reduction in dry weight of Striga as compared to unweeded check, while they were at par with hand weeding treatment. The grain yield of cv. 5-4-1 was higher (19.9 q/ha) than cv. CSH-8R (7.7 q/ha). The grain yield of sorghum was highest in hand weeding treatment (12.3 q/ha) followed by 100-25 N-P_2O_5 kg per ha (12.2 q/ha), 2,4-D (11.8 q/ha) and ethrel at 2 L per ha (10.7 q/ha) appied treatments. Higher levels of ethrel were toxic to sorghum.

POTENCY OF 2,4—D AND DICAMBA MIXTURES ON THE CONTROL OF CANADA THRISTLE (Cirscium arvense) IN WHEAT

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Four doses of dicamba (0.10, 0.20, 0.40 and 0.80 kg/ha), 2,4-D (0/25. 0.50, 1.0 nd 2.0 kg/ha) and their combination in ratio of 5:1 (0.20, 0.40, 0.80 and 1.60 kg/ha) alongwith untreated control were compared in a randomized block design. The dose response relations were represented by a straight line on the basis of profit analysis.

The studies on the joint action of 2.4-D and dicamba indicated that the amount of dicamba required to reduce 50% growth (GR 50) of Canada thristle was 5.8 times greater than 2,4-D and 2.2 times greatr than 2,4-D + dicamba. Dicmba caused a greater reduction in the plant height, number of grains per ear head, length of ear head and grain yield of wheat as compared to 2,4-D or 2,4-D + dicamba. Number of spikelets per ear head of wheat did not change significantly in all the treatments. 2,4-D and dicamba mixture (5:1) revealed an antagonistic effect on Canada thristle. Total protein content, total soluble sugars and reducing sugars were decreased by 2,4-D, dicamba and 2.4-D + dicamba after 25 days of spray. Mixture of 2,4-D and dicamba even at a lower potency than dicamba alone proved more promising in controlling Canada thristle without any significant adverse effect on the wheat crop.

Echinochloa crusgalli L. CONTROL IN TRANSPLANTED RICE

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Field experiments were conducted during monsoon and witer seasons of 1983 on black clay soils of medium fertility status at the Tamil Nadu Agricultural University, Coimbatore. The treatments consisted of pre-emergence application of anilofos alone (0.15, 0.30 and 0.45 kg/ha), anilofos mixed with 2.4-D EE (0.1 + 0.4, 0.2 + 0.4, 0.3 + 0.4 kg/ha respectively), pre-emergence 2,4-D EE at 0.8 kg/ha, pre-emergence butachlor at 1.5 kg/ha and all the above treatments followed by one late hoeing. These were compared with farmers practice of manual weeding twice on 15th and 35th day after planting and unweeded control.

The major annual grass weed of the crop was **Echinochloa crusgalli** in monsoon and winter seasons. This was effectively controlled by pre-emergence application of anilofos at 0.45 kg/ha followed by one late hoeing. The intensity and dry weight of thsi annual grass weed was minimum in the above treatment. A combination of anilofos and 2.4-D EE (0.2 + 0.4 kg/ha) followed by one late hoeing had an affective broad spectrum weed control and this recorded the highest grain yields of 5263 and 3267 kg/ha in monsoon and winter seasons respectively.

CONTROL OF WINTER POPULATION OF PARTHENIUM HYSTEROPHORUS

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The noxious weed, **Parthenium hysterophorus L.** is normally a monsoon plant, grow vigorously as soon as the rains starts. However, the critical studies revealed that it can grow through out the year, the only limiting factor is soil moisture, temperature and photoperiod had little effects on growth and development. Seed disseminated from monsoon population germinate in winter when rains are recieved and the plants reain in rossette from in want of adequate moisture. During on set of monsoon these rossette plants grow vigoursly. In view to control winter population of **Parthenium** established in wasteland, twelve herbicides at different rates were tested as post emergence application at 20 days seedling stage.

The study revealed that 2,4-D Na slat 1.0 and 1.5 kg/ha 2,4-D ester salt 1.0 kg/ha, common salt (NaC1) 10% and 15% solution, isoproturon 1.0 kg/ha controlled **Parthenium** seedling effectively. Oxadiazon 0.5 kg/ha, pendimethalin 1.0 kg/ha, metoxuron 1.0 kg/ha, terbutryn 1.0 kg/ha burnt the foliage only nd regeneration after a month was noted. Instantaneous kill was noted due to common salt and plants not regenerated. 2,4-D showed curlingand contortation of leaves from next day, killing effect was cronic, seedling became yellow gradually and kiled within 2 to 3 weeks. The seedling treated with isoproturon were killed with-in a week.

WEED BIOLOGY AND ECOLOGY

WEED SEED DISTRIBUTION IN WHEAT—A CASE STUDY

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Two hundred wheat seed samples were collected from 25 farmers from 8 district of Haryana. The samples were analysed for weed seed containmination. 250 grams sample lot was subjected to screening manually to seperate the seeds of different weed species.

The frequency of various weed seeds contamination in various districts revealed that percentage of samples contaminated with different weeds were different in different districts. The frequency of **Lathyrus aphaca, Asphodelus tenuifolius** and **Vicia sativa** was observed to be 66.7, 70.8 and 75 per cent in Rohtak, Mahindergarth and Faridbad districts, respectively. The frequency of Avena ludoviciana was 40, 56.2, 71.8 and 77.8% in Jind, Faridabad, Kurukshetra and Ambalal districts, respectively. In Hisar district most samples were contaminated with **Convolulus arvensis** and **Vicia sativa.** These studis reveal that the effeciency of various methods of weed control should not be judged on their short term performance but it should be judged by the production of seeds and their contamination with grain as a long term approach.

ANGIOSPERMIC WEED FLORA IN PULSES GROWN IN RICE FALLOWS IN KRISHNA WESTERN DELTA OF ANDHRA PRADESH

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Weed flora of rice fallows with the pulse crops, blackgram and greengram, in Krishna Western delta of Andhra Pradesh was surveyed during Rabi season 1983. The region lies at 16°15′ N latitude and 80°30′ E longitude.42 species belonging to 35 genera of 19 angiospermic families were observed and enumerated. Species of Cyperaceae, Poaceae, Asteraceae and Euphorbiaceae together represent more than 50% of weed population in the investigated area. Of these species 15 were seen coming up prior to crop emergence, 12 during early period of crop growth and the rest (15) subsequent to the establishment of the crop.

WEED SURVEY IN NORTH WESTERN ZONE OF TAMIL NADU

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Salem district: In wetlands **Echonochloa colonum** and **Cyperus difformis** were predominant. In garden land **Dactyloctenium aegyptium, Cyperus rotundus, Tridax procumbens, Digera aryensis** and **Trianthema portulacastrum** were the major weeds in most of the crops like sorghum, pearl millet, maize, cowpea, groundnut, sesamum, castor, cotton, sugarcane, tapioca, chillies, brinjal, tomato, bhendi, ribbedgourd, NB 21 grass and mulberry. Under rainfed condition **Cynodon dactylon, Bulbostylis barbata, Borreria hispids, Boerhaavia diffusa, Celosia argentea** were found with higher frequency and relative density in crops like sorghum, sesamum and castor.

Cyperus rotundus is the problem weed in tuber crop of tapioca. Annual grass **Rottboellia exaltata** was noticed iwht less intensity and frequency. Major weeds infeting coffee plantation were **Ageratum conyzoides, Eupatorium glandulosum, Bidens pilosa, Oxalis corniculata, Mimosa pudica** and **Euphorbia geniculata.**

Dharmapuri district: In the wetlands of Dharmapuri **Echinochloa colonum, E. crusgalli** and **Cyperus difformis** were predominant. In garden land **Dactyloctenium aegyptium, Digitaria sanguinalis, Echinochloa colonum, Cyperus rotundus, Borreria hipida, Portulaca Oleraceae** and **Amaranthus virdis** were found with high frequency and relative density in crops like wheat, pearl millet, finger millet, groundnut, sesamum, funflower, crysanthemum, lablab, beans, horsegram, cabbage onion, temato, cotton and sugarcane. **Parthenium hysterophorus** infestation was noticed with high intensity 50/m^2 and frequency even up to cent percent in both waste and clutivated lands of of this region.

SURVEY OF WEED FLORA ASSOCIATED WITH VEGETABLE AND ORCHARD CROPS AT VARANASI

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Survey was conducted to observe the weed flora present in vegetable and orchard crops. The common vegetable crops of rainy season are okra, brinjal, tomato, chillies, cowpea an cucurbits and common vegetable crops of winter season are cabbage, cauliflower, pea, carrot,radish, turnip, spinach beet and fenugreete. The common constitutents of the present orchards include lime, mango, guava, Indian jujube. The weeds present in rainy season vegetable crops were **Amaranthus viridis, Trianthema portulacastrun, Solanum nighrum, Boerrhavia diffusa, Laggera aureta, Echonochloa colonu, Cyperus retundus, Cynodon dactylon, Portulaca oleracea, P.quadrifida, Sorghum helepense, Dactylocternium aegyptinum, D. arvensis.**

The weeds present in winter season vegetable were **Chenopodium album, Chenopodium murale, Convolvulus arvensis, Asphodelus tenuifolium, Lathyrus aphaca, Fumaria indica, Fumaria parviflora. Cinchorium intibus, Desmodium trifolium, Launea splenifolia, Lathyrus sativa, Leucus asper, Melilotus, alba, Melilotus indica, Phyllanthus niruri, Trigonella incia, Anagallis arvensis. Euphorbia thymaefolia, E. hirta, Vicia hirsuta, Vicia sativa, Cyperus rotundus** and **Cynodon dactylon.**

The weeds present in orchard crops were **Achyranthus asper, Urena lobata, Malvastrum comandesianum, Sorghum helepense, Saccharum spontaneum, Solanum nighum,Cynodon dactylon, Corchorus aestuans, Ageratum conyzoides, Tribulus terrestris, Trianthems portulacastrum, Echinochloa colonum, Ipomoea eriocorpa, Anagalis arvensis, Phyllanthus niruri, Convalvulus arvensis, Argemone mexicane, Antirrhinum orontium, Euphorbia hirta, Verbena officinalis, Datrua fertuosa.**

SURVEY OF WEED FLORA AND INTENSITY OF CERTAIN WEEDS IN MAJOR CROPS OF CROP ZONE-II AND IV OF GUJARAT STATE

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Weeds are the principal source of crop loss in tropical and subtropical climate. Our previous survey indicated that ony about 40 weed species causing tremendous loss inmajor crops ofmiddle Gujarat.Hence knowledge ofindntification, locality and ecology of such weeds need due consideration. during the year 1982-83 survey was carried out in Zone-II Residual Soil Cotton Zone; and IV-Deep black Soil. Cotton zone. During the survey 41 weed species belonging to 18 families were encountered. In crop zone II **Eragrostis**

major was dominant weed in cotton. In crop zone-IV **Echinodoa crusgalli** and **Vernonia cinerea were conspcuous weeds in cotton and pigeon pea respectively. Irrespective of zones, the population of Cyperus rotundus** was uniformly dominating the weed flora.

SURVEY OF THE WEED FLORA AND INTENSITY OF CENTRAIN WEEDS IN MAJOR CROPS OF CROP ZONE-I, V AND VIII OF GUJARAT STATE

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Recent technology of weed management requires good knowledge of weed flora and its intensity in crop fields. In view of this, survey work was taken up in crop zone-I, V and VIII of middle Gujarat.

Under sandy loam conditions of middle Gujarat, infestation of weed convering wide range of species, both under cropped and non-corpped areas. The present survey was restricted to terrestial flora grown under cropped land. The sruvey covered crop zone I-Residual Soil Maize Zone covering Lunawada, Santrampur, Zalod, Dohad, Devgadhbaria, Godhra,Shehra and Limkhedatalukas of Panchmahal district, crop zone-V sandy loam soil-pearlmillet tobacco zone covering Anand, Brosad, Nadiad, Petlad,Matar, Thasra and Kapadwanj talukas and crop zone VIII clay alluvial soil-cotton-Dry Wheat zone covering Khambhat taluka of Kheda district.

During the survey 40 weed species were collected from different crops belonging to 16 families. **Cyperus rotundus** had unfiormly secured first or second rank in respect of intensity in all the crop zones. In crop zone-I maize and paddy crops were surveyed. In both the crops **Cyperus rotundus** ranked first asmost common weed. However, intensity of **Cynodon dactylon** ranked second inmaize while **Digera arvensis** had second position in paddy. In crop zone-I **Cyperus irria** was conspicuous compared to **Cyperus rotundus.**

The highest weed count/0.25 m^2 of **Cyperus rotundus** was observed in Petlad taluka followed by Nadiad, Thasra, Anand, Kapadwanj, Borsad and Matar taluka. In Petlad,Nadiad,Thasra and Anand Talukas, Canal irrigation facilities are increasing which encourage **Cyperus rotundus** persistency.In crop zone-V **Chenopodium album** was dominant in tobacco, pearlmillet and wheat.

Inc crop zone VIII pearlmillet, tobacco, paddy and cotton were surveyed. **Cyperus rotundus** was not observed in cotton.Majority of weeds found in cotton belonging to dicot group.However overall intensity of weeds indicated that **Echinochloa colonum** and **Cyperus rotundus** were the predominant weeds of this zone.

EFFECT OF WATER MANAGEMENT PRACTICES ON RELATIVE COMPOSITION OF WEED FLORA IN RICE

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Field experiments were conducted to study the effects of water management practices in transplated rice on relative composition of weed flora during monsoon seaons of 1982 and 1983. Water management practices had a marked effect on composition of weed floras.In general, sedges were major weed flora in all the water management treatments followed by broad leaved weeds and grasses. Although broad leaved weeds were secnd in number but none of broad leaved species constituted more than 6 per cent in any of the water management practices. The relative composition of dominant weed floras as effected by different water management practices were **Cyperus rotundus** (25.8%). **Fimbristylis milliaceae** (21.0%) **Cyperus iria** (19.6%) and **Cynodon dactylon** (11.6%) under continuous submergence (5+2 cm), **F. milliaceae** (40.2%) **E. crusgalli** (10.2%), **C. rotundus** (10.3%) and **C. iria** (10.9%) in continuous saturation, **F. milliaceas** (42.0%), **C. rotundus** (12.5%), **C. iria** (9.3%), **E. crusgalli** (8.0%), **E. colonum** (5.9%), **Cynodon dactylon** (6.1%) in partial submergence at tillering and flowering stages and **F. milliaceae** (41.5%) **C. rotundus** (11.9%), **E. crusgalli** (7.4%), **E. colonum** (5.6%), **Cynodon dactylon** (5.6%) under alternate wetting and drying conditions.

WEED DYNAMICS IN ORCHARDS OF KASHMIR VALLEY

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The study pertains to the dynamics of weeds in the artificial agroecosystems of Kashmir, mainly under apple cultivation. The habitats are characteristically represented by neutral to slightly alkaline soils with PH 7.6 to 8.2 depending only on noutral precipitation as a source of irrigation that maintains the soils with hgh misture content during March (55.5%) and minimum in September (12.2%). Investigations reveal as many as 73 phenerogams distributed among 27 dicot and monocot families from the ground vegetation of these orchards which reveal a distinct life from spectral pattern in relation to different easons encountered in the Valley. Maximum number of plant species are encountered during peak summer, i.e. August (42 plant species) which continues to decrease through autumn and winter seasons with a record of only 22 species in November and after a brief lapse continues to increase again through the spring till next summer. Chamaephytes and hemicryptophytes increased with increase of average temperatures during different months upto Ocotber and falls thereafter. October supported maximum therephytes under extreamly low precipitation.

Though **Cynodon dactylon, Medicago denticulata** and **Agropyron respens** are the dominant elements which are recorded with high relative density, frequency and Importance values, only **C. dactylon** registers a consistent dominance through different months except for January where **Medicago denticulata** takes the lead and is recorded with highest importance value. However, the relative density and frequency values for the different dominants vary during the different months as a

seasonal response vis-a-vis the growth behaviour. The weed register maximum biomass during peak summer at 51.5gm ^{2} due to favourable microclimate while the biomass isat its minimum durng January (9.3gm ^{2}) due to extreamly harsh climatic conditions and also because mostof the vegetal elements are indominant phase with a low percentage content of the above ground shoots. The different dominants yield variable biomass values during the different months with **C. dactylon** contributing maximum during late spring to early autumn followed by **Taraxacum officinale, Rubus ulmifolius, Urtica diocia,** and **Veronca beccabunga** during other seasons.

ECOLOGICAL DIVERSITY IN WEEDS OF KASHMIR VALLEY

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SRINAGAR-190 006

The present paper deals with the studies on ecologicalamplitude of weed flora sustained by diverse ecosystems in Kashmir. Kashmir valley with its peculiar seasonal behavious reflects it though a diversity in phenodynamism, seasonal pattern and more of perennation of different weed vis-a-vis their behavious and biology effected through macro-and micro environmental conditions of the habitat.

In these variable ecosystems weed elements like **Arabidopsis thaliana, Capsella bursa-pastoris, Ceratocephalous falcatus, Cynodon dactylon, Erodium cicutarium, Plantago spp., Poa annua, Trifolium repens** etc., which have wide tolerance range and ecological amplitude revealed by their occurrence both in agrestal and ruderal habitats. Contrarly some weeds like **Cardamine impatiens, Dianthus jacquemontii, Diplotaxis griffithii, Goldbachia laevigata, Lythrum hyssopifolia** etc., have a narrow tolerance and ecological amplitude. The paper also discusses the influence of these variable environmental stresses on the behavious and biology of agrestals and ruderals of Kashmir valley.

EFFECT OF CONTINUOUS USE OF HERBICIDES IN DIFFERENT CROPPING SYSTEMS ON THE CROP YIELD AND COMPETITION OF WEED FLORA IN WHEAT (Triticum aestivum)

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In field experiments conducted in the Experimental Area of the Punjab Agricultural University, Ludhiana (India), the effect of sequential application of herbicides to component crops in rice-wheat, maize-wheat and maize-potato-wheat on crop yield and composition of weed flora were studied from 1976-77 to 1981-82 on permanent plot basis. There was no change in the yield level of the component crops inany of the cropping systems due to application of herbicides to the component crops. On the basis of 6 years'

average data, the grain yield of wheat in the herbicide sequence plots was 29.2, 20.9 and 17.6 per cent higher compared to corresponding yield from the hand weedings in rice wheat, maize-wheat and maize-potato-wheat rotation, respectively.

The rice-wheat rotation suppressed the establishment of wild oat population in wheat and encouraged **Phalaris minor.** Maize-wheat rotation showed gradual build up of wild oats in wheet.

EFFECT OF CROP GEOMETRY ON INCIDENCE OF WILD OATS (Avena ludoviciana Dur.) IN WHEAT.

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Feild experiments were conducted at Punjab Agricultural University, Ludhiana during the year 1979-80 and 1980-81 to study the effect of crop geometry on the yield of wheat and incidence of wild oats.

During both the years bi-directional sowing of wheat (with half the seed rate in each direction with rows crossing at right angles) gave significantly more yield over east-west and north-south directions; which, when averaged over yers, was 11.7% and 6.5% more than east-west and north-south respectively. Bi-directional sowing also gave 21.2% reduction in the dry matter of wild oats over uni-directional sowing. However, it did not prove a substitute for post-emergence application of metoxuron against wild oats.

During 1979-80 closer row spacing (15.9cm) gave a significant increase in the grain yield of wheat over normal row spacing (22.5 cm). But during 1980-81 both were found to be on par with each other since if failed to give any smoothing effect on wild oats.

CROP-WEED ASSOCIATION STUDIES IN THE CROP LANDS OF GURUKUL NARSAN (SAHARANPUR) U.P.

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The systematic account of the dominant weeds associated with various crops is the first step before suggesting any weed control measures especially by the use of herbicides. The investigation was conducted as a field study during **Kharif** and **rabi** seasons during the year 1981-'82 regaridng dominant weeds and their degree of preponderance in the crop lands of Gurukul Narsan (Saharanpur) U.P. The important crops of the tract such as Paddy (**Oryza sativa L.**), Maize (**Zea mays L.**), Sorghum (**Sorghum vulgare** pers.), Pearl millet (**Pennisetum typhoides** Burn.) Blackgram (**Vigna mungo** (L.) Hepper) and Greengram (**Vigna radiata** (L.) Wilczek.) were selected for study during **Kharif** and in rabi wheat (**Triticum aestivum** Linn.) Gram (**Cicer arietinum** L.) Pea (Pisum sativum L.), Mustard (**Brassica juncea** (L.) Czern & Coss), Potato (**Solanum tuberosum** L.) and Berscem (**Trifolium**

alexandrinum L.) were selected. The dominant weeds that were associated witht he above crops were presented inths paper. Some of the important doimanant weeds in **Kharif** crops are **Echinochloa colonum** (L.) Link., **Cyperus rotundus** L., **Sorghum halepense** (L.) Pers., **Digera arvensis** Forsk., **Commelina benghalensis** L. and **Amaranthus viridis** L. In rabi crops **Chenopodium album Linn. Phalaris minor** Retz., **Medicago denticulata** willd; **Lathyrus sativa** L. **Melilotus indica** (L.) All, **Cichorium intybus** L. are some of the dominant weeds.

WEED FLORA OF FOREST SONPUR COMPARTMENT NO. 3-BASTAR

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Abstract : The survey of weed flora in forest at Sonpur Compartment No.3, Gudaweda (Narayanpur), Bastar has beendone during 1980. The highest density was noted in **Vitex** spp. (Dotokanda) followed by **Hedychium** spp., **Curcuma** spp., **Dioscoria** spp. **Spatholobus** spp., **Urena lobata, Sesumplos** spp., **Melotus** spp., **Dadluchanthus** spp. and **Albzzia procera. Amongst grasses, Oplisemnus burmanii** had the higher density followed by **Paspalum flavidum** and **Digitaria adscendense**. The perennial tree climbers were **Butea superba. Ventilago** spp. and **Vitex** spp. The seedlings of **Tictona grandis** (Teak) had the very low density and occurrence a compared to other weed plants. The flora having medicinal values, consisted of **Dioscoria** spp. **Curculago orchioides, Chlorophytum tubrosum, Giginber capitata, Hemidesmas indica, Rundia uliginosa, Rowoulfia surpentina, Celastrus paniculata, Embelia robusta** etc. in the adjoining area.

SCREENING WEED SUPPRESSING RICE VARIETIES.

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A short duration rice culture IRSB 34-69-1 was observed to form a very dense crop canory at late tillering stage, almost prohibiting sunlight to penetrate the surface. This trait may prevent weed growth. Inorder to assess its weed suppressing ability, a replicated field experiment was conducted at B.A.C. farm, Sabour during Kharif 1983 where six varieties were included alongwith ths and it was measured interms of fresh and dry matter accumulation by weeds.The result indicated that the minimum fresh anddry wegith of weeeds of 87.73 and 31.80 g/m^2 respectively was obtained in the plot of IRSB 34-60-1 whereas the maximumfresh and dry weight of weeds to the tune of 263.07 a and 85-67 g/m^2 was recorded inthe plot of ES 1-1-1. The result confirms the weed suppressing ability of IRSB 34-69-1 by virtue of its morphological frame.

COMPETING ABILITY OF WEEDS IN COMPARISON WITH CROP PLANTS

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BAPATLE (A.P.)

Competing ability of weeds in respect of seed production, mode of reproduction, root/shoot ratio and number of stomata per unit area of leaf was studied in comparison with crops at R.M.P. college, Narsan (Saharanpur) U.P. in 1982. The information thus collected will be useful in devising simple, effective and economical methods of weed control. Observations show that the weeds are superior to crops inrespect of the above competing characters,indicating that the weeds are better adapted to win out the competitin with the asscociated crops.

MANAGING WEEDS IN A WATERSHED

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Watershed management involves proper landuse,and protection against all forms of deterioratin. Efficient weed management is important, as weeds a) compete for nutrients andmoisture, which are limiting in dryland conditions, b) their removal of slopy lands may mean more erosion in initial stages due to absence of cover, c) their control by mechanical weeding on slopy lands will loosen the soil and with rains, further contribute to soil loss, d) competition will affect the crop, in turn providing poor cover, which will further increase erosion. It is impertative, to adopt integrated weed management approach to increase the production and protection of the watershed. Stratagy could be to provide protection to land from erosion by providing better cover, as a result of management, choice of crops and cropping systems and by changing the crop geometry and orienting cultural operation to reduce overland flow. Limited information is available onths aspect and there is a need to fill the gap.

Eroded land supports poor crop growth. Hence, crop choice will play important role in weed managment. Adoption of simple conservation measures, like contour farming could be of great help.It is suggested that, a) mechanical or manual weed control in levelled land and b) chemical weed controlwithoutsoil distrubance, alongwith contour cultivation and suitable crop management, on moderate slopes to better compete with weeds, and c) quick growing smothering crop at slopy lands, use of herbicides and avoidingmechanical control or alternate land use maybe a good approach. It may help to increase the production and protect the watershed.

EFFECT OF DEPTH OF PLANTING ON EMERGENCE, GROWTH AND COMPOSITION OF Convolvulus arvensis.

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H. A. U., HISAR.

Convolvulus arvensis is a noxious perennial weed which causes maximum harm to crops in winter season as it remains dormant in summer and rainy season. In order to find out the depth from which seeds can produce seedings, this experiment was planned.The growth pattern, sugar and nitrogen content of seedlings was also recorded.

Seeds were planted in earthen pots filled with soil and FYM (8:1) startingfrom surface, 1, 2, 3, 4, 5, 7.5 and 10 cm depth. Maximum emergence was obtained from seeds planted at one centimetre depth and as the depth increased emergence percentage decreased. Surface planted seeds had poor germination but compared to other depths their emergence percentagewasmore than seeds plantedat depths greater than 5 cm. Though the emergence percentage of surface planted seeds was low but their root and shoot length was maximum on 100th day after planting and there was progressive reduction in both root and shoot length with increase in depth of planting. There was practically no variation in sugar and nitrogen content of roots andshoots of seedlings planted at different depths recorded on 45 and 100 days after planting.

GROWTH AND DEVELOPMENT OF Trianthema portulacastrum Linn. AS INFLUENCED BY DIFFERENT DATES OF SOWING

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The effect of weather conditions on the emergence, growth and reproductive benavious of carpet weed was studied under different dates of sowing viz., June 10, June, 30, July 20, August, 10 and August, 30, 1984. First three dates resulted in significantly higher seedling emergence than later two dates. Growth in respect to leaft number, area of leaf, dry matter accumulation and number of branches plant ^{1} were significantly higher under 20th July sowing than rest of the sowing dates except 30th June where it was at par in these charcters.

Similarly, number of nodes plant ^{1}, seed node ^{1} palnt and seed yield palnt ^{1} were also significantly higher in 20th July sown, closely followed by 30th June than rest of the sowing dates.

Phenological behaviour of the plants indicates that (a) maximum seedling emergence takes place during June to July, (b) rapid and vigorous growth occurs during the rainy season when conditions for growth are optimumand (c) production of flowers and seeds starts in 20 to 30 days after sowing.

NOTES ON WHITE FLOWERED RACE OF STRIGE GENSERIOIDES A NOTORIOUS WITCHWEED SPECIES

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In a survey of the flora of Nalgonda District,a population of a species of witchweed **Striga**

generioides has been met with. Since already, withchweeds provided a great threat to crops in our country and elsewhere, a deeper study into theindentity and morphological features of the population in question occurring in close proximity to Bajjrafields, has been made. This population is found to be the only one of its kind showing competely white corolla as against the purple or purple throated corollas earlier on record. A correspondence with Prof. L. J. Musselman, a **Striga** expert revealed that it could be yet another manacing race of the witchweed in the rnaking but its status needs to be confirmed by further study. The details of teh species and the diversifying populations are discussed in the paper.

PRELIMINARY STUDIES ON CHEMICAL CONTROL OF Lantana camara(L.)

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Lantana camara Linn. is one of the abnoxious weeds, about 15 species of which are found in abundance. This poisonous species and aggressive invador has been reported from different ecological environment. An experiment in non-cultivable waste land in the Research Farm ofDeptt. of Agronomy & Agrometeorology, HPKVV, Palampur was conducted at the recession of the rainy season (i.e. 2nd week of Sept., 1984). The Lantana bushes in an area of 6 m^2 were selected. The experiment consisted of seventeen treatments viz. Glyphosate @ 2 kg ai/ha (Single spray), Glyphosate @ 2 kg ai/ha (Two sprays at 20 days interval), Glyphosate 2.5 kg ai/ha (single spray), Glyphosate @ 2.5 kg ai/ha (Two sprays at twenty days interval), Glyphosate @ 2.0 kg ai/ha + Hgcl2 + 2, 4DNP (1:1 Mixture, 0.5 ppm each), 2-4D Ethyl ester @ 2 kg ai/ha, 2,4-DEE + Hgcl2 + 2, 4DNP (1:1 Mixtue, 0.5 ppm each). Ammonium sulphamate (2% solution), Ammonium sulphamate (2% solution) + Hgcl2 + 2, 4-DNP (1:1 mixture, 0.5 ppm each) Alachlor @ 2.5 kg ai/ha, Alachlor @ 2.5 kg ai/ha + Hgcl2 + 2, 4-DNP (1:1 mixture,0.5 ppm each), Thiobencarb @ 2.0 kg ai/ha, Thiobencarb + Hgcl2 + 2, 4-DNP, (1:1 Mixture, 0.5 ppm each), Metribuzin @ 2 kg ai/ha, metribuzin @ 2.0 kg ai/ha + Hgcl2 + 2, 4-DNP (1:1 Mixture, 0.5 ppm each), Oxidiazon @ s kg ai/ha, Oxidiazon @ 2 kg ai/ha + Hgcl2 + 2, 4-DNP (1:1 Mixture, 0.5 ppm each).

The results of the trial recorded on the phytotoxicity rating after about 3 months of application revealed that the combination of Glyphosate 2 kg ai/ha + Hgcl2 + 2, 4-DNP (1:1 Mixture, 0.5 ppm each) completely killed the weed and there was no regeneration at all upto the period of observation. Glyphosate @ 2.5 kg ai/ha (Two sprays at 20 days interval) was the next best treatment followed by Glyphosate 2 kg ai/ha (Two sprays at 20 days interval), Glyphosate 2.5 kg ai/ha and Glyphosate 2 kg ai/ha (both single spray).

BIOLOGY OF Echinochloa crusgalli AS INFLUENCED BY DIFFERENT CULTIVERS OF RICE (Oryza sativa)

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Field studies on the growth and development of **Echinocnloa crusgalli** in relation to different cultivers of rice were carried out at the Punjab AgriculturalUniversity,Ludhiana. The tall cultivar (Var. Basmati 370) showed about 43 per cent reduction in the number of tillers of this weed as compared with the dwarf rice cultiver (ver. Jaya). The tall rice veriety did not essert much smothering effect on the height of **Echinochloa** but drastically reduced (73 per cent) the seed production potential of this weed as compared to dwarf variety. These studies thus revealed that dwarf crop genotypes are poor competitors of **Echinochloa** and as a consequence of this, the weed plants shed huge quantity of seeds in the field.

GERMINATION AND SEEDLING GROWTH OF Echinochloa crusgalli L. AS AFFECTED BY FLOODING

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Department Of Agronomy,
Punjab Agricultural University,
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Fresh seeds of **Echinochloa crusgalli** did not show any germination at $32^0 + 1^0$c in an incubator. Seeds stored under laboratory conditions for one season gave 70% germination. The seeds retrieved from a typical rice field showed a maximum of 5% germination in May-June. The seeds kept under 5 cm of water did not germinate beyond 16 dyas of flooding and rotted. The pot culture studies revealed that 5 cm standing water for 15 to 28 days significantly reduced the seedling emergence and establishment of **Echniochloa.** In another set of experiment, 3 cm to 9 cm of standing water for 4 weeks resulted in significant reduction in seedling emergence and establishment. The inhibitory effect of 6 and 9 cm of standing water on **Echinochloa** was significantlymore pronounced than 3 cm of standing water. The seeds which did not germinate, had disintegrated in due course of time.

EFFECT OF DIFFERENT CROPS ON THE GROWTH AND DEVELOPMENT OF WILD OATS (Avana ludoviciana Dur.)

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Field studies were carried out on permanent plot basis at the Research Farm of the Punjab Agricultural University, Ludhiana from 1971-72 to 1974-75. The wild oat population in plots under Egyptian clover and sweet clover disappeared by the time of conclusion of this 4 years study due to repeated cutting of these fodder crops. Indian mustard (Raya) for seed production also showed suppressing effect on height, number of tillers per plant and number of panicles per plant of wild oats and produced 6.5 q/ha drymatter

of this weed against 36.2 q/ha in wheat crop given two hand weedings (hoeing). However, these lanky and stunted wild oat plants in the mustard crop flower and set viable seeds. Hand pulling of wild oats before sead shedding from chick pea plots proved quite effective in reducing its intensity. Herbicide treated wheat crop also showed a marked reduction in the intensity of wild oats as compared to wheat given two hoaings. These studies also revealed that the wild oat plants that escape mortality from herbicide treatment stay as o potential source of future infestation in the field. However, the winter fodder crops proved quite effective in reducing the intensity as well as dissemination of this weed, but this practice has its own limiations.

LONGIVITY OF WEED SEEDS IN SOIL STORED AND BOTTLE STORED CONDITIONS.

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Horsepurselane, Parthenium, Amaranthus and Echino Chola were commonly found as agronomic weeds of Tamil Nadu. The experiment being conducted under laboratory conditions. The above weed seeds were collected in the month of August 1982 and stored in two different conditions viz. (i) Seeds stored in bottles and kept in laboratory (ii) Seedsmixed with soil and stored in bottles. The number of viable weed seeds is monitored by monthly sowing of the above weed seeds from two different storage conditions.

Parthenium seeds stored in bottel and soil stored showed 78.2 and 80.4 percent germination respectively 16 months after seed storage. Parthenium seeds shown the 52 percent viability 19 months after seed storage. The seeds of Echinochola stored in bottles gave (40%) values of germination than the soil stored seeds (19.2%) 15 months after seed storage. There was an increase (10 to 40 %) in value of germination 15 months after seed storage. This shown some of the growth inhibiting chemicals may be leached out from the seed as the storage period increased.

EFFECT OF DICAMBA AT GRADED DOSES AND INTERVALS OF APPLICATION ON THE CONTROL OF WHILTE HORSE NETTLE (Solanum elaegnifolium/Cav)

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A field experiment was conducted during 1982-1984 at Kalangal to study the cumulative effect of repeated application of dicamba (3,6, dichloro - 0 - anisic acid) on the control of white horse nettle. The treatment comprised of 4 levels of repeated application of dicamba in combination with reduced dose of dicamba or manual weeding each under three intervals (75, 150, 225 days) of application and one untreated control. The herbicide applied as per the treatments up to 10 months. After the every application, the population of **Solanum elaeagnifolium** was estimated at different stages. The photosynthetic rate was measured 24 hours after every spraying in the treated plants by using Infra Red Gas Analyser (IRGA).

Results indicated that population in dicamba 1.92+0.96+0.96 kg/ha plots were always less. Among the fourlevels of dicamba the difference in the population was significant. Application of herbicide at 75 days intervals had significantly reduced the regeneration of **Solanum elaeagnifolium.** The total dry matter production and the photosynthetic rate was also significatnly reduced by the dicamba application.

REGENERATION OF Solanum elaeagnifolium, CAV IN RELATION TO LENGTH OF ROOT, DEPTH OF PLACEMENT AND HERBICIDE DICAMBA.

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COIMBATORE

The results of the trials conducted at Tamil Nadu Agricultural Unversity, Coimbatore indicated that **S. elagagnifolium** as short as 10mm were able to regenerate. No regenration of shoots were formed from 20 and 30 cm depth of planting. Soaking roots of solution indicamba concentration 10^{4} (Molar) was sufficient to prevent regrowth of fragments.

WEED BIOLOGY OF SOME GRASSY WEEDS OF KHARIF CROPS UNDER MID-HILL CONDITION OF H.P.

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The life cycle of four grassy weeds of kharif crops namely Cralsgrass (**Digitaria sanguinalis** scop), yellow nutsedge (**Cyperus iria** L.), fall panic grass (**Panicum dichotomiflorum**) and water grass (**Echinochloa colonum** L.) was studied inpost in the glasshouse of the Vishva Vidyalaya. The weeds differed markedly with respect to their per cent germination and various events leading to maturity including the number of seeds produced. The results will be discussed in relation to their significance and infestation in crop fields.

EFFECT OF DEPTH OF PLANTING ON EMERGENCE, GROWTH AND COMPOSITION OF Convolvulus arvensis

Jai Prakash
Department of Agronomy,
H. A. U., HISAR.

Convolvulus arvensis is a noxious perennial weed which causes maximum harm to crops in winter season as it remains dormant insummer and rainy season. In order to find out the depth from which seeds can produce seedings, this experiment was planned. The growth pattern, sugar and nitrogen content of seedlings was also recorded.

Seeds were lanted in earthen pots filed with soil and FYM (8:1) starting from surface,1, 2, 3, 4, 5, 7.5 and 10 cm depth. Maximum emergence was obtained from seeds planted at one centimetre depth and as the depth increased emergence percentage decreased. Surface planted seeds had poor germination but compared to other depths their emergence percentage was more than seeds planted at depths greater than

5 cm. Though the emergence percentage of surface planted seeds was low but their root andshoot length was maximum on 100th day after planting and there was progressive reduction in both root and shoot length with increase in depth of planting. There was practically no variation in sugar and nitrogen content of roots and shoots of seedlings plantd at different depths recorded on 45 and 100 days after planting.

SPROUTING AND GROWTH PATTERN OF Pluchea lanceolata

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Pluchea lanceolata is a perennial weed of semi arid regionsinHaryana. It is more harmful to cropsin kharif season as during winter season it becomes dormant. It starts fresh growth in late February.

In order to find which portion of the plant is more potent source of its dispersal root and shoot cuttings of this plant were planted in last week of February in a field and their sprouting and growth behaviour was recorded at periodical intervals. Seeds of **Pluchea lanceolata** were placed onmoist filter paper in petri dishes and they were placed inincubator maintained at 20^0 and 25^0c.

It was observed that root cuttings sprouted earlier as well as in greater number than shoot cuttings. The growth of seedlings from root cuttings was more both interms of length and number of branches. The reason for better sprouting as well as growth of root cuttings seems to be their not getting dry in the soil while shoot cuttings get dried up by the time they start rooting and thus are unable to establish and grow well. Seeds did not germinate at any of the temperatures tried.

TRANSLOCATION OF 2,4—D IN Parthenium hysterophorus L.

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Translocation of 2,4-D in **Parthenium hysterophorus** L. plant from one part to another was studied. Application of 6000 ppm 2,4-D solution (equivalent to 3 kg 2,4-D/500 litre of water/ha) was done, before flowering to (1) whole plant, (2) one complete branch (3) all axillary buds only (4) one exillary bud only (5) apical bud of main stem only and (6) leaves only leaving the axillary and apicalbuds. The rate of application (quantitv and concentration of spray solution) was constant for all parts. It was noted that the killing effects were localised and only the treated parts were succumbed or formed tumour. The complete killing was noted only in case of whole plant treatment and in partially treated plants the growth of the unsprayed parts were continued. It revealed that 2,4-D was not translocated sufficiently from the one part to another in any direction in plant of **Parthenium** to cause killing effects and it showed the binding ability.

STUDIES ON WEED EMERGENCE PATTERN IN TRANSPLANTED RICE.

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In an experiment conducted at Rice Research Station Kaul in Haryana state during kharif, 1980 and 1981. Maximum weed population was recorded in July 16 transplanted crop. Total weed population decreased with delay in transplanting from June 16 to July 1 and to July 16. Weed species **Echinochloa crus-galli, E. colonum, Cyperus iria, Eclipta alba** and **Paspalum disticum** were all found more in June 16 transplanted crop than July 1 and July 16 transplanted ones. Dry matter production and nitrogen uptake by weeds was recorded maximum in June 16 transplanted crop and least in the July 16 transplanted one. Thus, the June 16 transplanted crop has faced heavy competition from weeds than July 1 and July 16 transplanted crop. Weed density, dry matter production and nitrogen uptake by total weeds decreased with incease in the duration of weed free maintenance upto initial 45 days after which three was poor emergence of weeds as the crop has developed enough canopy. The major flushed of the weeds have emerged during the period from 15th to 45th day of transplanting. **Echinochloa crus-galli, E.colonum, Cyperus iria** and **Eclipta alba** have emerged maximum durng first 45 days after transplanting. Weed free maintenance for initial 45 days, therefore redueced their population, dry matter productionand the nitrogen uptake at subsequent successive stage of the crop growth when compared to the weedy check. It was only the **Paspalum disticum** which has emerged after 30 dyas of transplanting where too, weed free maintenance of 45 days was found enough to have controlled it.

NEW HERBICIDES AND IMPLEMENTS

MOLINATE FORMULATIONS FOR WEED CONTROL IN TRANSPLANTED FICE

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Four formulations of molinate at different rates and time of application were tested for weed control in transplanted rice, cv. Bala in 1984. The molinate formulations were SC 9907, SC 9908, SC 9909 and SC 9910 and were compared with the effectiveness of Butachlor (Machete 60 EC). Pendimethalin (Stomp 30 EC), Hand weeding at 23 and 45 days after transplanting (DAT) & untreated control. Twentyfive days old seedlings were transplanted on 21st July in a RED with 4 replications. The treatments were applied as per plan. From observations recorded at 35 and 65 DAT, **Echinochloa** spp., **Ammania baccifera** L. and **Cyperus** spp. were found to be major weeds. Weed control treatments. in general showed reduction in

Echinochloa spp. compared to untreated contrl.Early application of molinate gave more effective weed control than late application. The molinate for mulation SC 9909 at 6 kg ai/ha and 6 DAT gave the best result and was comparable to pendimathalin at 3 kg ai/ha 4 DAT in terms of both weed control and grain yield. These three treatments gave significantly higher grain yield than two hand weedings. There was a significant reduction in grainyield when no weed control was used as compared to all other treatments.

TOLERANCE OF RICE TO FLUAZIFOP-BUTYL

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Fluazifop-butyl,at 0.03, 0.06, 0.12, 0.24 and 0.48 kg/ha; fluazifop-butyl 0.03 kg/ha, immediately followed by 2,4-ethyl ester (2, 4-DEE), 0.20 kg/ha; and 2,4-DEE, at 0.20 kg/ha were applied at 25 days after transplanting (DAT) rice (cv. Bala), during **kharif** 1984. Treated plants were compared with untreated crop for the tolerance to fluazifop-butyl. At rates up to 0.12 kg/ha fluazifop-butyl did not cause any significant effect on the rice as compared to the untreated crop. At 0.24 and 0.48 kg/ha fluazifop-butyl significantly reduced plant height and delayed the crop maturity by 7 days. At 0.48 kg/ha there was moderate to high scorching in rice but recovered after 21 days. Dryweight of plant and tiller count at 65 DAT, grainand straw yield of rice under different rates of fluazifop-butyl wer comparable to that in untreated plot.

COMPARATIVE BIOEFFICACY OF NEW BRAND FORMULATIONS OF ATRAZINE AND SIMAZINE FOR WEED CONTROL IN MAIZE (Zea mays L.)

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Field studies were carried out during **kharif** (summer) 1982 and 1983 in which the bioefficacy of two new brand formulations of s-triazines viz. sugarazine (atrazing) and sugazine (simazine) was found tobe comparable with atrazine and simazine with regard to their weed control potential. During 1982 sugarazine and sugazine at 1.0 kg/ha pre-emergence gave 3.29 and 3.66 t/ha grain yield, respectively as against 3.87 t/ha for atrazine 1.0 kg/ha and 2.54 t/ha for control (no weeding). During second year, maximum grain yield of 2.8 t/ha was recorded in the pre-emergence applicatin of atrazine 1.0 kg/ha, which was closely followed by the pre-emergence application of sugarazine (50 and 80 WP).

EFFECT OF CHLOROTOLURON AND OXYFLUORFEN ON Phalaris minor AND WHEAT YIELD.

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Oxyfluorfen and two formulations of chlorotoluron (Tolurex and dicruon), each at three rates of application, were evaluated for their efficacy in controlling **Phalaris minor** in wheat. Pre-emergence as well as post-emergence application of Tolurex and dicuron and pre-emergence application of oxyfluorfen caused significant reduction in the density of **P. minor.** Density of **P. minor** was reduced with the increase in herbicide rates. Post-emergence application of tolurex was more effective than its pre-emergence application in reducing the population of **P. minor.**

All the herbicides at different rates produced significantly more wheat grain yield than weedy check. There was significant increase in the grain yield with the increasing rates of pre-emergence application of tolurex and oxyfluorfen. Post-emergence application of tolurex and dicuron at 2.0 kg/ha produced significantly more grain yield than their post-emergence appication at 1.0 kg/ha. Pre-emergence application of tolurex, dicuron, each at 2.0 kg/ha, Pre-emergence application of tolurex, dicruon, each at 2. kg/ha, oxyfluorfen at 0.3 kg/ha and post-emergence application of tolurex and dicuron at 2.0 kg/ha produced grain yields at par with weed-free condition. Uncontrolled weeds caused an average grain yield reduction of 63.6% when compared with weed-free condition.

CHEMICAL WEED CONTROL IN Mentha arvensis L. WITH FUSILADE.

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Mentha suckers were sown in lines 45cm apart. The experiment was laid out on randomised block design with five treatments comprising of control, hand weeded control and 1, 2 and 3 L/ha of Fusilade in 3 replications. Fusilade was sprayed in two equally split doses post emergence after 30 days of planting. Dicot. weeds were hand weeded from all treatments except control after 30 days. Thirtyfour days after the first spray second half of the split dose was applied and a third spraying was given after 44 days.

The first two sprays did not effectively control the perennial grasses i.e. **Sorghum halepens, Cyperus rotundus** and **Cynodon dactylon** rather, they continued to grow. **Mentha** crop, **Anethum graveclens** and a number of dicot. weeds were also not affected by this chemical. Whereas, five days after the third spray, yellowing of leaves was seen in these grasses and the injury progressed at 2 and 3 L/ha fusilade. Subsequently, **Sorghum** and **Cynodon** died but some reduced clumps of former were available at 1 L/ha concentration.

At the first and second harvest herb yield was comparatively higher than control and hand weeded control, reaching maximum at 3 L/ha.

Weed counts at the end of the second harvest revealed that **S. halepense** was maximum affected compared to **C. rotundus** and **C. dactylon.** Of the annual grasses **Brachiara** sp. did not completely die. **A. graveolens** was also resistant.

WEED MANAGEMENT STUDIES WITH NEW HERBICIDES IN WINTER PLANTED PLANTED POTATO (Solanum tubersum L.)

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Two setsof experiments were conducted at Indore to study the most effective weed management practice in potato, using some new herbicies. First set of experiment comprised of ten treatments Antor 1.5, 2.5 kg ai/ha, Oxyfluorfen 0.1, 0.2 kg ai/ha, Ametryn 0.8, 1.6 kg ai/ha as pre emergence and Fusilade 0.25, 0,375 kg ai/ha, weed free and weedy check were included. In the second set of experiment eight treatments included the comparision of Fusilade applied at 0.188, 0.250, 0.375 kg ai/ga with Farmers practice, weeding broad leaf weeds + Fusilade 0.250 kg ai/ha, weeding all narrow leaf, weeding all broad leaf weedsand weedy check.

In both the sets of experimentation extent of weed competition was relatively less but the tuber yields differed significantly. Highest yield of 294 g/ha was though recorded in hand weedings, it was followed by Fusilade 0.375 kg/ha, Ametryn 1.6 kg/ha and Oxyfluorfen 0.2 kg/ha. all other herbicides though reduced the crop weed competition substantially the tuber yields were much less to hand weeding treatment. In the second set of experiment maximum tuber yield of 297 g/ha was obtained in the farmers practice followed by Fusilade 0.375 kg/ha and Fusilade 0.250 kg/ha + removing broad leaf weeds. Presence of narrow leaf weed perhapes adversely affected the tuber size in potato crop.

INFLUENCE OF HALOXYFOP METHYL, METOLACHLOR AND ACIFLUORFEN ON WEED CONTROL IN SOYBEAN (Glycin max (L.) MERRIL)

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To manage the weeds in soybean, three herbicides viz., haloxyfop methyl 0.25, 0.40 kg/ha pre em, haloxyfop methyl 0.25, 0.40 kg/ha post em 15 days after sowing (DAS), metolachlor 1.0, 2.0 kg/ha pre em and acifluorfen 0.48 kg/ha post em (15 DAS) were compared with 2 hand weeding (20 and 40 DAS) and weedy check.

The **Cyperus rotundus** was the dominant weed with codominants of **Echinochloa crusgalli** Beauv., **Ageratum conyzoides** L., **Commelina communis, Phyllanthus niruri, Cyanotis**

axillaris, Alternanthera sessilis, Eclipta alba Hassk., **Physalis minima** and **Cyperus iria.** The populatin of **Cyperus rotundus** could not controlled by any of these herbicides. Haloxyfop methyl as pre or post emergence controlled only **Echinochloa crusgalli.** Pre or post emergence application of metolachlor controlled **Cyperus iria, P. niruri, P. minima, C. axillaris.** Post em application of acifluorfen 0.48 kg/ha controlled **C. iria, A. conyzoides** and **P. niruri.**The total weed biomass was lowest in haloxyfop methyl 0.4 kg ai/ha post em. The highest grainyield was noted in haloxyfop methyl post em followed by metolachlor 2 kg/ha but the difference were nonsignificant as compared to control which was attributed touncontrolled growth of **C. rotundus** and other weeds.

BIO-EFFICACY OF FUSILADE INCOLE CROP VEGETABLE SYSTEM

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Studies on the bio-efficacy of Fusilade (Fluozifop-butyl) applied after 20 days of transplanting cabbage and cauliflower vegetables were executed at the M.P. JailGardens,Indore during 1984 rabi season under irrigated system. Predominance of **Cynodon dactylon, Cyperus rotandus, Panicum** spp., **Paspalum** spp., **Dinebra arabica, Ischaemum pilosum** in sedges and perinnial grasses and **Euphorbia** spp. **Chenopodium album, Amaranthus** spp., **Lunea aspienifolia, Molilotus** alba, **M. indica** in dicot weeds was observed in the experimental plots.

The results indicated that the size and weight of green heads per ha was maximum in total weed free conditions, being 1.85 kg and 592 g/ha in cabbage and 1.38 kg and 432 g/ha in cauliflower, respectively. The marketable heads and the produce of these vegtables in Fusilade applied @ 3.0 L/ha or 2.0 L/ha supplemented with weeding broad leaf weed ranked in close proximity with that of weed free treatment. Bio-efficacy of Fusilade to inflict weed kill in the given vegtables system was, however, relatively low at the lower rates of appliation. Board leaft weed extendedmore intense competition than the narrow leaf, adversely affecting the head size and the total produce of both cabbage and caulfflower.

CHEMICAL CONTROL OF GRASSY WEEDS WITH FUSILADE INSOYBEAN CROP IN THE STATE OF M.P.

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Trials were conducted om 1984 at several locations in different districts under the OILFED in M.P. to evaluate the effectiveness of Fusilade for controlling weeds in soybean crop. Treatments of Fusilade at 250 gm ai/ha applied two weeks after planting was compared with the same treatment of Fusilade followed by one intercultural operation given two weeks after herbicidal treatment, local practice of two intercultural operations, and unweeded control.

The major weeds associated with soybean crop in these districts were **Echinochloa** sp., **Setaria** sp., **Dactylocatenium aegyptium.**, **Cynodon dactylon**, **Digitaria** sp., **Commelina benghalensis**, **Celosia argentea**, **Chorchorus** sp., **Lagascea mollis**, **Cyperus rotundus** and **Sorghum halepense.** In general, grasses were found to be the predominating weeds out of which **Echinochloa** sp. and **Cynodon dactylon** offered competetion to soybean crop in the monsoon season causing considerable losses upto 35 to 70% in the grain yield. Broadleaved weeds were pesent in the trial sites but these did not pose much of a problem possibly due to the elemination of grasses which were suppressed by the crop canopy.

Fusilade at 250 gm ai/ha was found to control effectively the major annual and perennial grasses in soybean. Fusilade treatment alone gave excellent control of **Echinochloa** ap. **Cynodon dactylon** and also suppressed **Sorghum halepense** for the season. Fusilade did not control any of the broadleaved weeds and **Cyperus rotundus.** Although super-impositin of one intercultural operation improved the yield of soybean to some extent but it was marginal.Fusilads treatment in all the locations resulted better yields compared to local practices of two intercultural operatins. Fusilade treatments gave on an average 4 to 7 Q/ha more grain yield than the unweeded controland 2 to 4 Q/ha more than the local practice. These findings of 1984 work are going to be confirmed in large scale trials in 1985 season when the need of one intercultural operation in addition to Fusilade treatment would be critically studied.

RESPONSE OF Vigna radiata, V. mungo AND ASSOCIATED WEEDS TO FLAUZIFOP-BUTYL

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Influence of two levels of flauzifop-butyl (0.25, 0.5 kg/ha) as post emergence foliar sprays at 15 and 25 days after sowing (DAS) was studied on **Vigna radiata** and **V. mungo** and associated weed species under fieldhaving medium soil. The weeds were Ageratium conyzoides L., **Cyperus iria** L., **Cyperus rotundus** L. **Echinochloa crusgalli** Beauv, **Cynodon dactylon** Pers., **Mollugo** spp., **Caesulia axillaris** Roxb., **Commelina bengalensis**, **Phyllanthus niruri** L., **P.simplex** and **Digitaria adscendence** Henr. Both the levels at the DAS controlled **Echinochloa crusgalli**, **Cynodon dactylon Mollugo** spp. and **Corchours** spp. Plants sucmbed within a week at higher level. The later spray was less effective. Other dicot weeds, sedges and crops were tolerant. The higher level produced longer and narrower leaves withmore dark green colour as compared tountreated crop plants. The greater reduction in weed biomass and increase incrop yield was noted with 0.25 kg/ha at 15 DAS in green gram while 0.5 kg/ha at 25 DAS gave higher yield in black gram. Study revealed that ths selective herbicide can be used to control weeds ingreen gram and black gram where grassy weeds are dominant.

INFLUENCE OF FLUAZIFOP-BUTYL ON WEED CONTROL, GROWTH AND YILED OF SOYBEAN

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To manage the weeds in soybean var. JS 72-44, two levels of fluazifop-butyl (0.25 and 0.50 kg/ha) were tested as pre emergence, psot emergence at 7 and 15 days after sowing (DAS) and compared with 2-hand weeding (HW) at 20+40 DAS and a weedy check. The dominant weeds consisted of **Cyperus iria** L. **C. rotundus** L. **Commelina communis** L. **Cynodon dactylon** pers., **Ageratum conyzoides** L. **Phyllanthus niri** L. **Physalis minima** L. **Echinochloa crusgalli** Beauv., **Eclipta alba** Hassk., **Corchorus olitorious** L. **Alternanthera** DC., and **Solanum nigrum** L. Out of these weeds fluazifop-butyl 0.5 kg/ha as post em at 7 DAS effectively controlled **Echinochloa crusgalli** follwed by **Cynodon dactylon.** The sedges and dicot weeds were uncontrolled. Through fluazifop-butyle, the weed control was obtained to the extent of 26% at 0.5 kg/ha postem 7 DAS whereas 2-HW 20+40 DAS gave 92% control.

Pre or post emergence appliation of fluazifop-butyl at both the levels did not show phytotoxic effect on germination, crop growth and development. The significantly higher soybean yield was obtained from the plots treated with 0.5 kg/ha post em 7 DAS as compared to weedy check. On the basis of weed species susceptibility this herbicide was found more suitable for control of only grassy weeds in soybean crop.

EVALUATION OF NEW HERBICIDE AC 252925 (ARSENAL) IN CONTROLLING WATER HYACINTH AND PARTHENIUM WEEDS.

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In a recent trial at Visva-Bharati University, Insitute of Agriculture, W.Bengal it was found that the new herbicide AC 252925 with chemical name 2-4 (isopropyl-4) methyl-5-oxo-2-imidazolin-2 yl) nicotinic acid (trade name Arsenal-Insopropylamine salt formulatin) showed complete kill of water hyacinth plant grown in green house condition in big earthen vats when tried with as low a doze as 0.125 kg ae/ha in a month's tme.2,4-D herbicide with a doze of 2 kg ae/ha (trade product used Fernoxone with 80% ae) completely destroyed the weeds withina period of 8-10 days, while paraquat (trade roduct used Gramoxone-S at 3 lit/ha) fully killed the weed within 3 days. The new herbicide AC 252925 arrested the growth of water hyacinth plants within 7 days but the killing action is relatively slow compared to 2,4-D and Paraquat herbicides. Insituation where gradual destruction of water hyacinth vegetationis needed, AC 252925 has a great promises since the herbicide is absoribed through foliage and translocked throughout the plant quite rapidly.

In another preliminary investigation with CDA appliation (controlled droplet Application by CDA battery operated sprayer) on the poisonous **Parthenium hysterophorus** weed plants in waste land around Sriniketan,it was found that AC 25292 with a dose of 0.50 kg ae/ha starved the process of checking the further growth of these weed plants within a period of 100 days and complete kiling of plants occurred within 30-35 days.

INFLUENCE OF FLUAZIFOP-BUTYL AND HALOXYFOP-METHYL ON Sacchrum spontaneum L. AND Cynodon dactylon PERS.

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To control **Saccharum spontaneum** L. and **Cynodon dactylon** Pers. problematic perennial weeds, the application of DOWCO (Haloxyfop methyl) @ 1.25 kg ai/ha and Fusilade (Fluazifop butyl) @ 1.25 kg ai/ha was done in a cultivated filed. The post em application was done on new shoots of one month old, emerged after 2 harrowings done in the month of July. Two separate experiments were done on two locations,one dominated with **S.spontaneum** and second with **C. dactylon.** Other associated weeds consisted of **Dichanthium annulatum, Digitaria adscendense, Paspalum distichum, Bracharia raptens, Echinochloa crusgallia** and **Setaria glauca** amongst grasses; **Cyperus rotundus,C. iria, C. compresus** and **Fimbristylis** spp. amongst sedges and **Ageratum conyzoides, Alysicarpus** spp. **Caesulia axillaris, Corchorus** spp. **Commelina** spp., **Cyanotis axillaris, Euphorbia hirta,Eclipta alba, Phyllanthus niruri, Ph. simplex,** and **Sida carpinifolia** amongst broadleaf weeds.

The results, showed that both these herbicides were effective incontrolling the existing shoots of **Saccharum spontaneum** and **Cynodon dactylon** as well as other grasses viz.,**Echinochloa crusgalli,Digitaria adscendens, Paspalum distichum** foundinthe field. About 83 and 82% control of **Sacchrum spontaneum** was obtained by Dowco and fusilade respectively, Both the these herbicides were ineffective to control the sedges anddicot weeds found in the field.

The regeneration of **Cynodon** was not noticed upto about 4 months, later on the regeneration was noted. Hence it inferred that the one foliar spray was not effecient to exhaust the reserved food of under ground rhizomatic stems of **Cynodon** or **Saccharum** which require subsequent spraying. The other grassy weed did not regenerate even by the single spray of any of these herbicides.

WEED CONTROL BY IMPROVED TOOLS AND IMPLEMENTS

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Weed control is one of the most difficult tasks on an Agricultural farm. In order to incrase crop production, it is required to develop a suitable Weed Control Technology. It has realized by research experiments, that Mechnical weed control is one of the effective weed control method. In this paper the working and description of the improved weeding tools and implements is given. These tools and implements are now available. By using them aeration in the root zone of the crop and field capacity can be increased. Drudgery and cost of crop production can be reduced, for weeding operation. The construction and design details are also given for some very useful tools and implements.

WEED CONTROL IN CUMIN WITH RECENT HERBICIDES

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During 1983-84 and 1984-85 Rabi season trials were conducted on four cultivator's field in District of Mehsana (Gujarat) to assess efficacy of recent herbicides in Cumin.

Following treatments were tested for their bioefficacy :

Oxadiazon (Ronstar 25 EC) @ ai 500, 600 and 1000 gm/ha pre and post-emergence application, Isoproturon (Tolkan 50 WP) @ ai 250 and 375 gms/ha pre-emergence and Nitrofen (TOK-E 25) @ ai 2000 gms/ha post-emergence applications as a standard chemical check along with unweeded control.

Weed population was recorded at 30 and 60 days after sowing along with phytotoxicity rating and at the time of harvest, yield of cumin seed was recorded. Oxadiazon (Ronstar 25 EC) % ai 1000 gms/ha was found to be superior to all other treatments followed by Oxadiazon @ ai 750 gms/ha. Isoproturon (Tolkan 50 WP) was found phytotoxic to the crop even at lower dose of 250 gms/ha.

EFFECT OF SOIL RESIDUAL ATRAZINE ON SUCCEEDING MUNG CROP

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The study carried out to know the persistance of atrazine (2 chloro-4-ethylamino-6-isopropylamino-1, 3,5-S-triazine and its effects on succeeding mung (Var. PS-16) a general rotation crop in Kharif after rainfed rabi sorghum on which graded doses of atrazine i.e., 0(H_0), 0.5 (H_1), 1.0 (H_2), 1.5 (H_3), 2.0 (H_4) kg ai/ha as pre-emergence alone and pre-emergence doses such along with uniform post emergence application of 0.5 kg ai/ha i.e. 0.5+0.5 (H_5), 1.0+0.5 (H_6), 1.5+0.5 (H_7), 2.0+0.5 (H_8) kg ai/ha were tried earlier. In the same sorghum experimental plots the residual mung study was conducted without disturbing the soil and the layout by working cultivator twice after collecting the soil samples for residual analysis. The Mung seed was sown with seed drill at 30 cm apart in the first week of June in the two consecutive Kharif seasons of 1982 and 1983 in black clay loamy soil of college of Agriculture, M.A.U., Parbhani, in Randomized Block Design with six replications. The study indicated that the atrazine residues persisted till next kharif seasons and the concentrations showed a positive relation with the doses earlier applied. Higher residual concentrations depressed the stand or emergence of the plants at 4th day. The mortality study revealed that the mung plants in due course of time, absorb atrazine residues and built up concentration to the lethal level in all treatments irrespective of the level and method of application. Hence, to was advised to avoid mung crop with a tolerant crop of maize sorghum or millet.

PERSISTANCE OF PHYTOTOXIC RESIDUES OF ATRAZINE IN SOILS OF RAINFED RABI SORGHUM

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An investigation on soil persistance of strazine (2-chloro-4-athylamino-6-isopropy lamino-1, 3, 5-s-triazine) weedicide used in graded doses (0.0.5, 1.0, 1.5, 2.0 kg ai/ha as pre-emergence alone and preemergence doses each along with uniform post-emergence application of 0.5 kg ai/ha tried under different cultural practices on rainfed rabi sorghum (Var. SPV-86) on black clay loamy soils of College of Agriculture Farm, M.A.U. Parbhani. The residual analysis of composite soil samples collected in April, before kharif sowing at 0-5 cm and 5-10 cm depth in first year and 0-10 cm depth in second year revealed that the atrazine applied in rabi season (September and October) persisted as soil residue in varying concentrations irrespective of quantity, method of application and cultural practices adopted. However, higher doses of atrazine tried appeared to have left a little more atrazine residues. Since these residues were phytotoxic to sensitive succeeding crops like Mung, Urid, Cowpea, Pigeonpea, Sunflower, mustard and Cotton, the prsent investigation provide an opertunity to avoid such crops while planning different cropping systems.

NOTE ON EFFECTS OF RESIDUAL ATRAZINE ON SUCCEEDING ROTATION CROPS

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The crop stand in relation to residual concentrations had further concluded that the maize and sorghum were tolerant to atrazine residues as these crops maintained their stand and vigour till 4th week stage, while the dry paddy though tolerant to lower levels, but was adversely affected at higher residual concentration (Table 3). Similar tolerance and suseptibility to residues were seen with sunhemp, while the other two fibre crops were suseptible to even lower residual concentrations. Likewise, the oil seed and pulse crops proved their sesceptibility to any level of residual concentratin.

EFFICACY OF STOMP* BROAD SPECTRUM HERBICIDE IN THE CONTROL OF *Phalaris minor* AND OTHER WEEDS OF WHEAT IN INDIA - A REVIEW

A.L. Mookerjee

STOMP pendimethalin, a selective dinitroaniline herbicide discovered and developed by American Cyanamid Company effectively controls a wide spectrum of annual grasses and broad-leaved weeds in many agronomic and horticultural crops. STOMP acts by inhibiting early seedling development of susceptible weed species which die shortly after germination or following emergence from the soil. STOMP has been extensively tested in India in the control of ***Phalaris minor*** and other weeds of wheat. The product has also been successfully evaluated in the control of weeds of rice, cotton, potato, onion, cumin, chickpea, soybean and groundnut in India. Presently, STOMP is under extensive field testing in many crops.

In a series of experiments conducted during the past several years, STOMP showed outstanding performance in the control of ***Phalaris minor*** and other weeds of wheat and gave significantly higher yields. In multi-location trials conducted under the All India Co-ordinated Wheat Improvement Project during 1980-81 and 1981-82, STOMP 30% EC @ 1.0 kg a.i./ha applied within 2 days of sowing of wheat gave excellent control of ***Phalaris minor*** and other weeds with corresponding higher yields in comparison to the existing wheat herbicides.

In this paper, the magnitude of weed problem in wheat with particular reference to ***Phalaris minor*** along with the highlights of work done on the efficacy of STOMP against these weeds is presented and discussed.

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