

EFFECT OF INTEGRATED WEED MANAGEMENT ON YIELD AND QUALITY OF SUNFLOWER

R. JAYAKUMAR¹, M. PREMSEKAR², N. KEMPUCHETTY³, and S. SUBRAMANIAN⁴

Field experiments were conducted during *Kharif* 1984 and 1985 at Tamil Nadu Agricultural University Farm with sunflower var Co.2 to study the quality of sunflower as influenced by different weed management practices. The pre-emergence application of fluchloralin at 0.75 kg/ha followed by one late manual weeding at 30 DAS enhanced the quality of sunflower and increased the protein and oil production by 130 kg and 336 kg/ha respectively over unweeded control. Fluchloralin at 1.25 kg/ha or the farmer's practice of two manual weedings at 20 and 40 DAS were the next alternative in enhancing the yield and quality of sunflower.

Sunflower (*Helianthus annuus*) is gaining ground in India as an important oil seed crop and herbicide usage for the control of weeds has become an inevitable one. Raju and Sankaran (1974), Krishnarajan *et al.* (1974) and so many workers have recommended number of herbicides for the control of weeds. The effect of these herbicides on the quality of sunflower is not known and there was not much of studies on this line. Jayakumar *et al.* (1985) found that application of herbicides in ground nut influenced the oil content under irrigated conditions. Hence the present study was conducted to find out the effect of integrated weed management practices on the quality of sunflower.

MATERIALS AND METHODS

Field experiments were conducted during *kharif* 1984 and 1985 at Tamil Nadu Agril. University Farms with sunflower Var. Co 2. The treatments were fluchloralin at 0.75, 1.0, and 1.25 kg/ha, butachlor 1.0, 1.25 and 1.50 kg/ha compared with fluchloralin 0.75 kg/ha + one manual weeding, butach-

lor 1.0 kg/ha + one manual weeding Farmer's practice of two manual weedings at 20 and 40 DAS and unweeded control. The experiment was conducted in a randomised block design with three replications. A common fertilizer dose of 40:60:40 kg NPK/ha was given uniformly to all plots. The grain yield data were collected plotwise and the samples were processed for analysis. The nitrogen content of the grain samples after extraction of oil was analysed by microkjeldahl distillation method (Humpries, 1957). The P and K contents were estimated by vandamolybdate and flame photometric methods respectively (Piper, 1966). The crude protein content was computed by multiplying the nitrogen content with the factor 6.25. The oil content was estimated using Soxhlet's extraction method. The crude protein and oil production per hectare were also calculated. The data were subjected to statistical analysis.

RESULTS AND DISCUSSION

The weed dry matter and yield as influenced by various weed manage-

1.2-Assistant Professor, 3-Associate Professor, 4.Director, Centre for Soil and Crop Management Studies, Tamil Nadu Agricultural University, Coimbatore-3.

Table 1. Effect of weed Management practices on weed dry matter and yield of sunflower

| Treatments | Kharif 1984 | | | Kharif 1985 | | |
|---|-------------|------------|----------------|----------------|-------|-------|
| | Total weed | Dry matter | Yield kg/ha | Total weed dry | yield | kg/ha |
| | kg/ha | kg/ha | | matter kg/ha | | |
| 20 DAS | 40 DAS | | 20 DAS | 40 DAS | | |
| Fluchloralin 0.75 kg/ha + one manual weeding | 344 | 484 | 1557 | 360 | 528 | 1303 |
| Fluchloralin 0.75 kg/ha | 357 | 525 | 1346 | 384 | 590 | 1030 |
| Fluchloralin 1.00 kg/ha | 345 | 528 | 1350 | 368 | 562 | 1088 |
| Fluchloralin 1.25 kg/ha | 312 | 503 | 1520 | 349 | 505 | 1192 |
| Butachlor 1.0 kg/ha + one manual weeding | 402 | 592 | 1232 | 428 | 629 | 934 |
| Butachlor 1.0 kg/ha | 402 | 565 | 1201 | 479 | 780 | 914 |
| Butachlor 1.25 kg/ha | 429 | 547 | 1336 | 438 | 694 | 988 |
| Butachlor 1.50 kg/ha | 381 | 528 | 1345 | 414 | 632 | 998 |
| Farmer's practice of two manual weeding | 387 | 545 | 1350 | 418 | 628 | 1066 |
| Unweeded control | 829 | 1315 | 800 | 966 | 1429 | 781 |
| SE (P) | 45 | 80 | 52.8 | 48 | 88 | 25.4 |
| CD (P = 0.05) | 94 | 166 | 110 | 101 | 174 | 53 |

Table 2. Quality of sunflower as influenced by herbicide application

| Treatments | Nutrient concentration | | | Crude protein content (%) | oil content (%) | Production kg/ha | |
|--|------------------------|------------------|----------------|---------------------------|-----------------|------------------|--------------|
| | N | P | K | | | Protein | oil |
| Fluchloralin 0.75 kg/ha + one manual weeding | 2.80 (2.18) | 0.810 (0.682) | 1.42 (1.81) | 17.50 (13.63) | 56.2 (56.9) | 272 (178) | 699 (741) |
| Fluchloralin 0.75 kg/ha | 2.46 (1.94) | 0.825 (0.613) | 1.24 (1.62) | 15.40 (12.13) | 56.2 (56.1) | 207 (125) | 605 (562) |
| Fluchloralin 1.00 kg/ha | 2.29 (1.98) | 0.825 (0.590) | 1.22 (1.68) | 14.35 (12.38) | 56.0 (56.4) | 194 (135) | 583 (613) |
| Fluchloralin 1.25 kg/ha | 3.36 (1.92) | 0.970 (0.582) | 1.38 (1.72) | 21.00 (12.00) | 56.8 (56.7) | 319 (143) | 691 (674) |
| Butachlor 1.0 kg/ha + one manual weeding | 2.86 (1.99) | 0.600 (0.582) | 1.24 (1.68) | 17.85 (12.44) | 55.3 (55.6) | 220 (134) | 545 (584) |
| Butachlore 1.0 kg/ha | 2.18 (1.84) | 0.675 (0.568) | 1.28 (1.66) | 13.65 (11.50) | 56.3 (55.3) | 164 (105) | 540 (505) |
| Butachlor 1.25 kg/ha | 2.30 (1.85) | 0.750 (0.600) | 1.28 (1.68) | 14.35 (11.63) | 54.3 (55.7) | 192 (115) | 580 (549) |
| Butachlor 1.50 kg/ha | 2.18 (1.88) | 0.710 (0.982) | 1.32 (1.69) | 13.65 (11.75) | 53.9 (55.8) | 184 (117) | 581 (558) |
| Farmer's practice of two manual weedings | 2.46 (2.02) | 0.748 (0.620) | 1.32 (1.78) | 15.40 (12.63) | 55.2 (56.8) | 208 (135) | 596 (607) |
| Unweeded control | 2.18 (1.72) | 0.637 (0.480) | 1.10 (1.58) | 13.65 (10.75) | 54.0 (54.9) | 109 (84) | 340 (478) |
| S. E. (D) | 0.16 (0.12) | 0.055 (0.04) | 0.17 (0.06) | 1.01 (0.73) | 1.7 (0.54) | 14.8 (13.6) | 50.4 (82) |
| CD(P=0.05) | 0.32 (0.24) | 0.114 (0.98) | N.S. (0.13) | 2.01 (1.53) | N.S. (N.S.) | 31.0 (28.0) | 104 (170) |

N.S. Not Significant. (The original figures represent Kharif, 1984 and the figures in parenthesis represent Kharif 1985).

ment treatment are presented in Table. 1. Application of Fluchloralin at 1.25 kg/ha registered the lowest weed dry matter at 20 and 40 DAS followed by fluchloralin 0.75 kg/ha + one manual weeding. The unweeded control registered the highest weed drymatter. The sun flower yield was the highest with fluchloralin 0.75 kg/ha + one manual weeding followed by fluchloralin application alone at 1.25 kg/ha. The unweeded control recorded the lowest yield.

The N, P, K, crude protein and oil content of sunflower and the protein and oil production are presented in Table.2 During *kharif* 1984 the N, P, and crude protein contents were influenced by weed management practices. The N, P and crude content were the highest in the treatment fluchloralin 1.25 ka/ha. The oil content was not influenced by the herbicide application since the oil content is mainly a genetic character which cannot be manipulated by agronomic practices. The highest yield was noticed in the fluchloralin 0.75 kg/ha + tne manual weeding followed by fluchloralin alone at 1.25 kg/ha. Hence higher crude protein and oil production were recorded in the above said treatments which were significantly higher when compared to unweeded control. During *kharif* 1985 significant differences were noticed in N, P, K, and crude protein contents except the oil content. The N, P, K and crude protein contents were the highest in the treatment fluchloralin 0.75 kg/ha + one manual weeding which was followed by fluchlor

alin alone at 1.25 kg/ha and farmers practice of two manual weedings. The same result was reflected with regard to yield. The production of protein and oil also fall in the same line as the production was mainly a factor of dry matter. The results of Jayakumar *et al.* (1985) in groundnut experiment confirm the present findings. From the above studies very clear that application of fluchloralin at 0.75 Kg/ha + one manual weeding enhanced the quality of sunflower and increased the protein and oil production.

Thanks are due to the ICAR All India Co-ordinated Research Project on oil seeds for conducting the experiment and publishing the research article.

REFERENCES

- HUMPMRIES, E.C. 1956. Modern methods of of plant analysis. 1: 468-502
- JAYAKUMAR, R., A. MOHAMEDALI and S. SUBRAMANIAN. 1985. Effect of dinitroaniline, methyl benzene and triazine herbicides on protein and oil production in *Arachis hypogea* Var POL.2 Oil Seeds J.XV (3&4).
- KRISANARAJAN, J., D. SIVASANKARAN, S. SANKARAN and Y. B. MORACHAN. 1974. Studies on the performance of herbicides in sunflower. *Madras Agric J.* 61 : 827-828
- PIPER, C.S. 1966. Soil and Plant analysis *Hans publishers* Bombay.
- RAJU, K. and S. SANKARAN. 1984. Studies on the pre-emergence herbicides in sunflower under graded doses of nitrogen. *Madras Agric, J.* 61 : 490-496