

Efficacy of Various Herbicides and their Concentration on Weed Management of Linseed in India

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ABSTRACT

Linseed is under cultivation since prehistoric times in the world. India is the largest (21.42%) linseed growing country in the world where it is grown in an area of 3.39 lakh hectares predominantly in the states of Madhya Pradesh, Maharashtra, Chhattisgarh, Uttar Pradesh, Bihar, Orissa and Jharkhand, besides other states on a limited scale. Linseed is an industrial oilseed crop grown during rabi season. Linseed has poor foliage and never forms a canopy; therefore, it remains a poor weed competitor throughout its life. Flax does not compete well with weeds because it produces little shade and uses water and soil nutrients less efficiently than most weed species. Weeds are a major impediment to crop production through their ability to compete for resources and their impact on product quality and are the major factors, which cause yield reduction of 15-50%, depending on weed density and type of weed flora and makes the weed control more complex. Herbicides are the most successful weed control technology ever developed. No doubt weed control through chemicals is easy, economical and labour efficient, the over dependence resulted in some serious environmental and ecological implications and continuous use of herbicides for weed control leads to residue hazards, weed shift and build-up of resistance in weeds. Weeds should be controlled when the crop height is between 5 and 10 cm. There are a number of herbicides recommended for efficient control of weed flora in irrigated linseed.

Keyword: Herbicides, Flex, Linseed, Crop-weed competition.

INTRODUCTION

Weeds can be a serious problem in flax if left uncontrolled. Because flax does not compete well with weeds, compared with other crops such as cereal grains, weeds have an excellent chance to develop in flax thereby reducing flax yield and seed quality. Herbicides are the most successful weed control technology ever

developed. No doubt weed control through chemicals is easy, economical and labour efficient, the over dependence resulted in some serious environmental and ecological implications and continuous use of herbicides for weed control leads to residue hazards, weed shift and build-up of resistance in weeds.

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In order to minimize the losses caused by weeds and also to reduce the sole dependence on costly and controversial inputs such as herbicides, considerable interest has aroused recently throughout the world in evolving technologies, which are within the reach of common farmers. Which is ecologically sound and socially acceptable. The recent awareness is to minimize the use of herbicides for weed management due to higher cost of cultivation (weeding). Flax does not compete well with weeds and thus needs extensive management for effective weed control. Flax does not rapidly cover the soil surface allowing weeds to recruit later within the season and out-compete it for nutrients and space.

Weed competition not only reduces yield but also leads to higher dockage within the grain because of high amounts of weed seed. Reduced yields are likely if weeds are not controlled within the first stages of plant growth. Weed control is required by the time flax emerges to reduce yield losses, since flax could also be a poor competitor with weeds. Pre-plant- incorporated (PPI) herbicides prevent weed emergence, minimize early weed competition, and maximize flax yields. Post emergence herbicides applied soon after weed emergence to small weeds and flax usually give better control and permit longer for flax recovery from possible herbicide injury than to larger weeds and flax.

Losses caused due to weeds in linseed

Weed causes great yield losses to crop, especially where a monoculture cropping systems is practice. At early stage, linseed cannot compete effectively with weeds, especially up to two months after sowing. Early removal of weeds is important before flowering because a yield reduction of up to 56% can be caused depending on the infestation level (Rezene, 1992). In general, all weed species do not equally contribute to this loss, so, it is based on weed distribution and abundance of weed species. Weed growth, population and distributions vary from place to places depending up on soil and climate factors. The difference in the effect of weeds on crops production is mainly due to

differences in characteristics and competitive status of the weeds and the crop, i.e. the ability of plants to obtain and use the growth determining and limiting resources, namely, light, water and nutrients

Long kumer and Singh (2013) reported that the crop management factors employed on the preceding crop of rice had significant impact on the expansion and yield of linseed. Residual effect of certain agronomic management aspects like nutrition and weed management in rice crop had significant effect on the productivity of linseed.

N2-75% NPK (recommended)+Azospirillum & Phosphotika and Butachlor @ 1.5 kg ha⁻¹ (PE) significantly recorded superior values in production of number of branches plant⁻¹, dry weight plant⁻¹, number of balls plant⁻¹ and seed yield (7.03 q ha⁻¹ and 7.21 q ha⁻¹) of succeeding linseed. Among the weed management practices, W3-Butachlor @ 1.5 kg ha⁻¹ (PE) recorded the utmost net return (40,020/- ha⁻¹) and benefit: cost ratio (2.00) than that of other weed management practices.

Factors of crop weed competition

The composition and competition by weeds is dynamic and is dependent on soil, climate, cropping and management factors. Water, mineral nutrients, and light are important environmental factors affecting plant competition and according to Clements, if the supply of any of these factors falls below the combined needs of the competing plants, competition begins.

Competition for space

Pali et al. (1997) noticed that the less competition of associated weeds for space might be the reason of increased branching in treated plots than in unweeded plots.

Hussein et al. (2002) reported that weed competition caused a significantly lower seed, straw and oil yield (29.6, 26.2 and 32.0%, respectively).

Competition for moisture

Mohammad et al. (2012) studied to determine the effect of planting date and irrigation stress on two spring varieties of flaxseed. The Highest capsule numbers per plant (65.9), seed

numbers per capsule (5.78), seed yield (1763 kg/ha), biological yield (5935 kg/ha), harvest index (29.9) Were obtained in first sowing date and under full irrigation by later sowing dates and limited irrigation stress especially at flowering and grain filling stages, this characters Were reduced.

Competition for light

Plant height and vertical leaf area distribution define effective components of the competitive struggle for light. It becomes most vital element of weed-crop competition when moisture and nutrients in soil are plentiful, and weeds have a foothold over crop plants in respect of their height.

Dubey et al. (2009) conducted an experiment at three locations i.e., CSK HPKV, Palampur, CSAUA&T, Kanpur and UAS Regional Station, Raichur. Maximum oil content was recorded at Palampur where the range of maximum and minimum temperature Were but that of Kanpur and Raichur locations. The oil content was found in decreasing trend with the rise of temperature.

Competition for nutrient

Weeds, which emerge simultaneously with crop plants absorb fertilizer nutrients faster and comparatively in larger, amount than crop, thereby depriving the crop of obtainable nutrients leading to poor yields. Competition for nutrients constitutes a crucial aspect of weed-crop competition. Weeds deplete considerable amount of nutrient from the soil and thereby offering severe competition for crop growth and development.

Rao and Nagamani (2010) opined that weeds generally have higher content of nutrients than crop plants. They grow and absorb nutrients faster than crop with the result that there could also be a scarcity of nutrient for the crop plants.

Effect of different herbicides for weed control in linseed

Linseed has poor foliage and never forms a canopy; therefore, it remains a poor weed competitor throughout its life. Flax does not compete well with weeds because it produces little shade and uses water and soil nutrients less efficiently than most weed species

(Gruenhagen & Nalewaja, 1969). Weeds should be controlled when the crop height is between 5 and 10 cm. There are a number of herbicides recommended for efficient control of weed flora in irrigated linseed.

Pendimethalin is a selective herbicide effective against most annual grasses and several annual broad-leaved weeds. It is applied as pre-emergence. Pendimethalin acts via inhibition of microtubule formation, disrupting cell division and causing microfibril disorientation. The study shows that pendimethalin (1.0 kg/ha) applied to different rabi crops persisted in soil up to 75 days after application and afterwards degraded completely, leaving no any toxic residues in post-harvest soil. Mishra et al. (2005) reported that pre-emergence application of squadron 3000 g /ha and sand mix application of pendimethalin 2000 g /ha though completely checked the germination of *Cuscuta* but proved to be highly phytotoxic to linseed. The maximum seed yield of linseed (1994 Kg) were obtained from *Cuscuta* free plot followed by pre-emergence application of pendimethalin 1.0 Kg/ha (1276 Kg), post-emergence application of glyphosate at 0.05 kg/ha (1264 Kg) and pendimethalin 1.5 Kg/ha followed by water spray (1183 Kg).

Imazethpyr is an imidazolinone compound used as a selective herbicide to regulate most annual grasses and certain broad-leaf weeds. This herbicide is applied as pre-plant incorporated, pre-emergence and early post emergence for control of annual and perennial grass and broad-leaf.

Singh et al. (2014) reported that weed control efficiency (WCE) during 2008 Were highest in two hand weeding's followed by imazethpyr at 75 g/ha sprayed 15 or 25 DAS and 100 g/ha at 25 DAS. During 2009, two hand weeding's and imazethpyr at 100 g/ha applied at 15 DAS gave similar WCE, which could flow from to similar dry weight of weeds in these treatments. Weed control efficiency Were lowest in imazethpyr at 50 g/ha at 15 also as 25 DAS thanks to poor weed control at lower dose during both the years. During 2008, application of imazethpyr at

100 g/ha at 15 DAS resulted in maximum pods/plant which were on par with imazethapyr at 75 g/ha at 15 DAS and 2 hand weeding's and significantly above all other weed control treatments.

Clodinafop-propargyl may be a systemic, post-emergence herbicide for selected grass control. Clodinafop-propargyl is absorbed by the leaves and rapidly translocated to the growing points of leaves and stems. It interferes with the assembly of fatty acids needed for plant growth in susceptible grassy weeds. Punia et al. (2005) reported that tank mixture of clodinafop + sulfosulfuron (3 : 1) at 60 g ha⁻¹ and fenoxaprop + sulfosulfuron (4 : 1 and 5 : 1) at 120 g ha⁻¹ provided 85-90% control of *Avena ludoviciana* and *Phalaris minor* and 60% control of broadleaf weeds like lamb's-quarters, *Melilotus indica* and *Rumex retroflexus*. Maximum grain yield (5240 kg ha⁻¹) were obtained in weed free treatment which were at par with clodinafop + sulfosulfuron (3 : 1) at 60 g ha⁻¹ and fenoxaprop + sulfosulfuron (4 : 1 or 5 : 1) at 120 g ha⁻¹.

Dorota Gaweda et al. (2012). Reported that the different metribuzin doses, the treatment (T3) metribuzin 70 % WP 0.420 kg ha⁻¹ registered the least weed population of 3.76 weed biomass of 135.66 kg ha⁻¹ highest weed control index of 77.84 per cent and least number of depletion of weed viz., 17.85, 2.30 and 12.36 kg ha⁻¹ of N, P and K during season I. Similarly during season II, the treatment (T3) metribuzin 70% WP 0.420 kg ha⁻¹ recorded least weed production of 3.80 kg ha⁻¹.

REFERENCES

- Dubey, S. D., Srivastava, R. L., & Singh, A. (2009). Influence of Climatic Condition during Crop Season on Oil and its Quality Components of Linseed (*Linum usitatissimum* L.). *Indian Agriculturist*, 53(3/4), 165-169.
- Gaweda, D., Cezary, A., & Kwiatkowski (2012). Weed infestation of spring common wheat (*Triticum aestivum* L.) grown in monoculture depending on the cover crop and weed control method. *Polish botanical society journal* 65.
- Gruenhagen, R. D., & Nalewaja, J. D. (1969). Competition between Flax and Wild Buckwheat. *Weed Science*, 17(3), 380-384.
- Hussein, H. F., El-Hariri, D. M., & Hassanein, M. S. (2002). Response of some Flax (*Linum usitatissimum* L.) Cultivars and Associated Weeds to Weed Control Treatments. *Egyptian Journal of Agronomy*; 24, 23-42.
- Longkumer, L. T., & Singh, P. L. (2013). Residual Effect of Sowing Dates, Nutrient and Weed Management in Rice on Growth and Yield of Succeeding Linseed. *International Journal of Bio- resource and Stress Management*. 4(1), 28-33.
- Mishra, J. S., Moorthy, B. T. S., & Bhan, M. (2005). Efficacy of Herbicides Against Field Dodder (*Cuscuta campestris*) in Lentil, Chickpea and Linseed. *Indian J. Weed Sci.* 37(3&4), 220-224.
- Mohammad, M., Amiri, R., Nezhad, H. I., Noori, S. A. S., & Zandvakili, O. R. (2012). Effects of Planting Date and Water Deficit on Quantitative and Qualitative Traits of Flax Seed. *American- Eurasian Journal of Agriculture & Environmental Science*, 12(7), 901-913.
- Pali, G. P., Patel, S. P., & Tripathi, R. S. (1997). Integrated weed management in irrigated linseed (*Linum usitatissimum*). *Indian J. Agron.* 42(1), 177-180.
- Punia, S. S., Sharma, S. D., Dahiya, S. S., & Malik, R. K. (2005). Evaluation of Prometryn and metribuzin against weeds in Wheat (*Triticum aestivum* L.). *Indian J. Weed Sci.* 37(1-2), 26-28.
- Rao, A. N., & Nagamani, A. (2010). Integrated Weed Management in India— Revisited. *Indian J. Weed Sci.* 42(3&4), 123-135.

Rezene, F. (1992). Weed science research on noug, linseed and rapeseed in Ethiopia. In: Oilseeds Research and Development in Ethiopia, First National Oilseeds Workshop, 3-5 December 1991, A.A., Ethiopia. 136-148.

Singh, G., Aggarwal, N., & Ram, H. (2014). Efficacy of Post-emergence Herbicide Imazethapyr for Weed Management in Different Mungbean (*Vigna radiata*) Cultivars. *Indian Journal of Agricultural Sciences*. 84(4), 540–543.