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RESEARCH ARTICLE

A PHYTOSOCIOLGICAL CASE STUDY OF SOME WEEDS ASSOCIATED WITH CROP SESAME (*SESAMUM INDICUM* L.) IN THE SEMI ARID REGION OF NORTH-WESTERN DESERT OF RAJASTHAN.

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Abstract

Weeds are excellent examples of successful struggle for existence. Weeds are adapted by their abundant seed production, dispersal, varied seed dormancies, high competitive potentiality and ability to spread rapidly. Weeds have unique potentialities for adaptation; they thrive in almost any environment and adjust themselves to the changed conditions. Survival is difficult in arid region, where conditions are most inhospitable and impose severe constraints on plant life. Once a certain weed species is introduced, its abundance or scarcity is determined largely by the degree of competition offered by the crop and the prevailing environment. In agro-ecosystem weeds are harmful because they interfere with agricultural operations, which increase labour, compete with crop for water, nutrients, space, soil, light etc., and finally reduce the crop yield. Not only this, weeds have enormous seed production, variety of seed dormancies, first to grow and multiply under stress conditions and power of vegetative multiplication. They show rapid spreading and a deep penetrating root system, resist drought, start flowering and fruiting much earlier than crop and finally produce seeds to continue their progeny .Weeds not only rob the crops of nutrients but also the moisture which is most important ingredient in rain fed cropping. In present study the crop weed association was composed of 22 species. High frequency percent was shown by *Tribulusterrestris*. *Farestiahamiltonii*, *Tribulusalatus*. The relative biomass of crop and weeds were somewhat in proportion to relative densities. The net production of crop was higher than that of weeds. The period between 30 to 60 days after sowing was most critical stage for crop weed competition.

Introduction:-

Agriculture is the process of managing plant communities to obtain useful materials from the small set of species we call crops. Weeds comprise the "other" set of plant species found in agro-ecosystems. Although they are not intentionally sown, weed species are well adapted to environments dominated by humans and have been associated with crop production since the origins of agriculture. The ecological role of weeds can be seen in very different ways, depending on one's perspective. Most commonly, weeds are perceived as unwanted intruders into agro-

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ecosystems that compete for limited resources, reduce crop yields, and force the use of large amounts of human labor and technology to prevent even greater crop losses. In agro-ecosystem weeds are harmful because they interfere with agricultural operations, which increase labour, compete with crop for water, nutrients, space, soil, light etc., and finally reduce the crop yield. Not only this, weeds have enormous seed production, variety of seed dormancies, first to grow and multiply under stress conditions and power of vegetative multiplication. They show rapid spreading and a deep penetrating root system, resist drought, start flowering and fruiting much earlier than crop and finally produce seeds to continue their progeny. Weeds are plants growing where it is not desired or plants out of place (Kassasian, 1971) or any plant not sown in the field by farmer (Vaidya, *et al*., 1978) or uninvited plants in agro-ecosystem.

Materials and Method:-

Phytosociological studies were undertaken in general sowing at field of sesame in the year 2016 only by quadrate method (Tripathi and Misra, 1971) and the variety of sesame grown was RT 46. The size of quadrate had been 1m sq (Pandeya and Saha, 1966) as determined by species-area curve method (Braun-Blanquet, 1932; Misra, 1968). 4 Quadrates were taken by random sampling and studied at site in year 2016 of kharif season after first shower in the month of July. Research site was located in crop field of sesame at village Ridmalsar lying 20 km in North-east to the city Bikaner and each quadrate was observed for density, frequency and biomass.

In each quadrate frequency, density and biomass of weeds and crop plants were recorded. Quadrates at site at each observations date have been clipped at the base and brought to laboratory in polythene bags. Then the harvest was separated species wise. The harvest had been dried in oven at 80 ^{o}C till constant weight and weighed to obtain aboveground biomass per m sq. or per quadrate. Such studies were started from two week after sowing i.e. on 15th, 30th, 45th, 60th, and 75th days. The relative frequency, relative density, relative biomass and relative importance value (RIV) were calculated with the help of following expressions –:

$$\text{Relative frequency} = \frac{\text{No.of occurence of species}}{\text{No. of occurence of all species}} \text{x}100$$

$$\text{Relative density} = \frac{\text{No.of occurence of species}}{\text{No. of occurence of all species}} \text{x}100$$

$$\text{Relative density} = \frac{\text{No.of occurence of species}}{\text{No. of occurence of all species}} \text{x}100$$

RIV = Relative frequency + Relative Density + Relative biomass.
The phytograms of crop and weeds were plotted (fig no.1and 2). The mean data have been presented in table 1.

Result and Discussion:-

The crop-weed associations have been decomposed of following weed: species *Tribulus terrestris* Linn. *Cenchurus biflorus* Roxb, *Cynodon dactylon* (Linn.) pers., *Farsetia Hamiltonii* Royle., *Trianthema portulacastrum* Linn, *Cenchrus cillaris* Linn. *Tribulus alatus* Delike. *Aristda Funiculata* Trin. et Rupr**.,** *Chorchorus fasicularis* (Linn.) Christensen, *Indigofera cordifolia* Heyene ex Roth, *I. linifolia* (Linn.F.) Retz., *Ipomea pestgigridis* Linn., *Boerhavia diffusa* Linn., *Convolvulus pluricaulis*, *Mollugo lotodies*, *Euphorbia hirta* Linn., *Areva pseudo tomentosa* Linn., *Crotolaria burhia* Buch-Ham., *Elusine compressa* L., *Cleome Brachycarpa* Vahl., *Leptadenia pyrotechnica* (forsk) Decne., *Cleome viscosa* L., *Heliotropium Indicum* Linn., *Ziziphus nummularia* (Burm.F.) Wight & Arn., *Digerium muricata* Linn., *Amaranthus spinosus* Linn., *Lasirus sindicus* Linn., *Citrulus colocynthis* (Linn.) Schrad, *Capparis spinosu*s Linn.

The maximum numbers of weeds were present on 45th and 60th days after sowing and minimum on 15th day after sowing. It seems that the competition at the time of germination was insignificant which could not affect the crop at its initial stage. A few weed *Tribulusterrestris*, *Cenchrusbiflorus* and *Farsetiahamiltoni* have been found on 15th day after the sowing and remained in an agro-ecosystem for the entire period of crop growth.

Tribulusterrestris,Farsetiahamiltoni, *Ipomeapestgridis*, *Crotolariaburhia* and *Elusinecompressa* have been regularly dispersed and *Trianthemaportulacastrum*, *Indigoferalinifolia* and *Cleome brachycarpa* have been irregularly dispersed. The above ground biomass of the crop plants (sesame) increased with growth till harvest. The total above

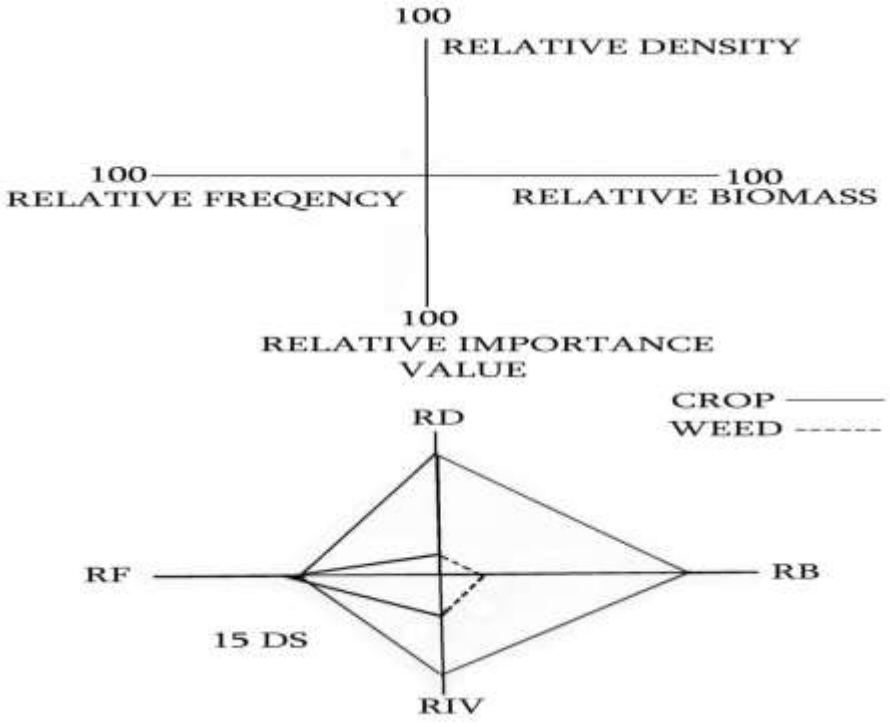
ground biomass of weeds also increased with growth, however, the value of the latter have been lower than those of crop plants at all the stages of growth. The above ground biomass has not been in proportion of frequency of weeds.

The relative biomass of crop (85.05 %) and weed (14.94 %) has been in proportion of relative densities at 15th days after sowing at the site. But there after the relative above ground biomass has not been in proportion of relative density or relative frequency of either the crop or the weeds.

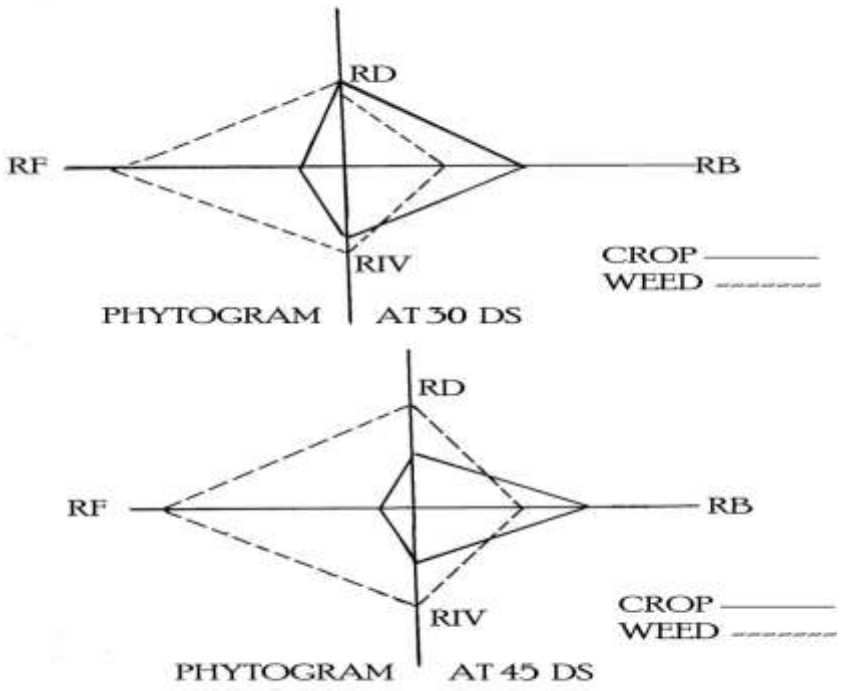
Table 1:- Relative importance value of crop (Sesame) and associated weeds in agro-ecosystem

Days after sowing ⇩	Relative Frequency		Relative Density		Relative Biomass		RIV	
DS	**CROP**	**WEED**	**CROP**	**WEED**	**CROP**	**WEED**	**CROP**	**WEED**
15	**47.61**	**52.37**	**84.96**	**15.02**	**85.05**	**14.94**	**72.54**	**27.44**
30	**17.54**	**81.96**	**49.01**	**47.77**	**53.81**	**46.18**	**40.12**	**58.63**
45	**10.41**	**89.67**	**28.86**	**67.33**	**53.21**	**46.78**	**30.82**	**67.90**
60	**10.10**	**90.13**	**23.09**	**76.85**	**68.85**	**31.14**	**37.38**	**66.04**
75	**15.38**	**84.53**	**30.17**	**69.73**	**78.89**	**21.70**	**41.28**	**58.65**

RIV gives a clear picture about the dominance of species. The RIV of crop has been maximum (72.54 %) in 15th DS and minimum (30.82 %) in 45th DS. RIV of crop shows a sharp decrease from 15th DS (72.54 %) to 30th DS (40.12 %) and gradual decrease up to 45th DS and then slow increase (table 1). The almost same trend has been shown by relative biomass. It reflexes that there had been maximum crop-weed competition at 45th DS and minimum at 15th DS; it means competition increases with increase of growth. The late increase of crop weed competition might be due to the late and periodic germination of many weeds (Koller 1961, Thurston 1960). The decrease of crop weed competition after 45th DS might be due to early completing of life cycle by weeds or environment had not been congenial for their growth.



PHYTOGRAM AT 15 DS (Fig no. 1)



PHYTOGRAM AT 30 AND 45 DS (Fig no. 2)

Conclusion:-

The present study reveals that phytosociolgical study is of immense importance in context to arid zone farming and also helps to understand the phenomenon of improving the yield of particular crops. In present study the crop weed association was composed of 22 species. High frequency percent was shown by *Tribulusterrestris*. *Farestiahamiltonii*, *Tribulusalatus*. The relative biomass of crop and weeds were somewhat in proportion to relative densities. The net production of crop was higher than that of weeds. The period between 30 to 60 days after sowing was most critical stage for crop weed competition.

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