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PHYTOSOCIOLOGY OF THE WEEDS OF BLACK-MUSTARD, GRAM AND WHEAT FIELDS

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The phytosociology of weeds in black-mustard, gram and wheat fields was studied in two agricultural farms near Alwar. The data obtained indicates that weeds were almost absent in the black-mustard field while a large number of weeds infest wheat and gram crop. *Chenopodium album* and *Melilotus indica* are dominant weeds in both the crops. However, the density and biomass per plant of most of the weeds was higher in wheat than in the gram fields.

Keywords: Biomass; Density; Frequency; Weeds.

Weeds are of wide spread occurrence in agro-ecosystems and are responsible for substantial losses in crop yield. Sen[1] has reported that weeds cause about 11.6% loss of grain production in the world and about 13 million tonnes, i.e. 25 percent of the total production in India. Weeds also act as collateral host for many plant pathogens and pests. In view of the adverse effect of weeds on crops, it becomes imperative to study the distribution and ecology of weed species in agro-ecosystems. Survey of weed flora of crops has been carried out by a few workers[1-4] and the phytosociology of weeds in crop fields have been studied by Saikia and Sharma[5] and Singh *et al.*[4] However no work has been done on the weeds of the crop-fields in Alwar district of Rajasthan. Hence, in the present study, an effort has been made to investigate the phytosociology and biomass production of weeds in gram, wheat and black-mustard fields.

Two agricultural farms which are situated in the vicinity of Aravali ranges at a distance of 3 km on the northern side of Alwar city were selected for the study. These farms are located in the north-eastern Rajasthan between latitude 27°5N to 28°10N and longitude 76°10E to 77° 15E. The soil vary from loam to sandy loam with 8.7 pH and 0.24 mv conductivity. The density and frequency of different plant species was studied following the method outlined by Misra[6] by laying 15 quadrats of $1M^2$ at random in each crop in January and February, 1994. For estimating net biomass, 20 plants of each crop species, and depending on the density and frequency of weeds, 5-20 plants of weed species were collected from the same fields when the crops were ready for harvest in the last week of March, 1994. All these samples were dried at 80°C in a hot air oven for 48 hrs to estimate dry biomass. The weed species were identified with the help of local flora[7].

Weed species were almost absent from the black-mustard fields as only two species, i.e. *Chenopodium album* with density 1.3, frequency 20% and biomass $0.03gm^{-2}$; and *Asphodelus tenuifolius* with density 0.5, frequency 12% and biomass $0.02\ gm^{-2}$ were present. The drastic reduction in the growth of weeds in black-mustard fields may be due to the severe competition between the weed and crop plants, which is further enhanced by the vigorous growth and closed canopy of the crop plants. The high net biomass production and density of black-mustard plants supports this assumption (Table 1).

Table 1. Density and biomass of crop-plant species in wheat, gram and black-mustard fields.

Plant species	Density	Biomass (gm^{-2})
Triticum aestivum (Wneat)*	360	1764
Cicer arietinum (Gram)*	98	400
Brassica nigra (Black mustard)	82	3485

*Each shoot is considered as one plant.

Table 2. Density, frequency and biomass of weed species in wheat fields.

Plant Species	Density	Frequency (%)	Biomass (g per plant)	Biomass (gm^{-2})
Chenopodium album	140	100	0.40	56
C. murale	8	53	0.30	2.5
Melilotus indica	70	100	0.04	2.8
Spergula arvensis	53	53	0.02	1.1
Asphodelus tenuifolius	9.3	40	0.46	4.3
Trigonella polycerata	4.8	33	0.28	1.3
Polypogon monspelinsis	2.9	13	0.19	0.6
Anagallis arvensis	1.3	26	0.45	0.6

The wheat and gram fields were infested with a large number of weeds (Table 2, 3). This may be due to the relatively more open canopy and less biomass production of wheat and gram crop plants in comparison to that of black-mustard (Table 1). Among the weed species, *Chenopodium album* and *Melilotus indica* are dominant weeds in both wheat and gram agro-ecosystems. However, the density and biomass production of most of the weed species was higher in wheat crop than the gram crop (Table 2,3). This may be because of frequent irrigation and use of chemical fertilizers by farmers in wheat crop which reduces the intensity of competition between weed and crop plants for nutrients and soil moisture. Although the density of weed species was very high in both the crops, their biomass production per plant was very low (Table 2,3). Nonetheless, these weeds species, their plants being at two to four leaf-stage, produce flowers and fruits, indicating their

Table 3. Density, frequency and biomass of weed species in gram fields.

Plant Species	Density	Frequency (%)	Biomass (g per plant)	Biomass (gm^{-2})
Chenopodium album	262	100	0.02	4.2
C. murale	169	46	0.02	2.7
Melilotus indica	16	80	0.06	0.9
Spergula arvensis	20	93	0.02	0.3
Trigonella polycerata	1.3	06	0.07	0.1
Anagallis arvensis	1.0	20	0.04	0.04
Convolvulus arvensis	1.6	33	1.46	2.3
Asphodelus tenuifolius	1.1	13	0.19	0.2

ability to self-perpetuate even under severe competition situations.

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