Density and Predominance of Weeds in Wheat Fields of Khuzestan Province

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Abstract: A study was done to identify and characterize densities of prevailing weeds in wheat fields. Wheat fields in 10 of 30 cities were reviewed in 2011 and a total of 124 weed species from 36 plant families were identified. 77 species and 91 species in the city than there were three farms. In terms of weed concentrations, the cities of Masjed Soleiman, Izeh and Baghmlk had higher concentrations of weeds per square meter at 20/82, 22/17 and 22/18, respectively than the cities of Dezful, Shushtar and Gutvand with weed concentrations of 91/77, 85/61 and 82/97, respectively. An overall total of 124 weed species were identified. Most of the species (52/97 percent) belonged to four plant families; Brassicaceae, Poaceae, Fabaceae and Asteracea. The Abundance Index (AI) identified the weeds *Avena Ludoviciana*, *Phalaris minor*, *Sinapis arvensis*, *Brassica nigra* as the most predominant weeds in the wheat fields of Khuzestan. The cities of Dezful, Shushtar and Gutvand had higher species diversity of 63, 57 and 52 respectively, and the cities of Izeh, Baghmlk, Masjed Soleiman, had lower diversities of 9, 18 and 19, respectively.

Key words: diversity, abundance, consistency, identify.

INTRODUCTION

The aim of this study was to identify and present information on the prevailing densities of weeds in fields as a contribution to the important issue of weed management. The identification of common weed species and their distribution may be incorporated into weed management systems to increase crop yields. Research, (Thomas, 1991) has shown that the distribution of weed communities is mostly dependent on climatic conditions; seasonal rainfall and temperature have important roles in weed distribution. The identification of predominant weed species for application in a weed management system involves using an index of Relative (Abundance Frick, RA., 1992; Thomas, 1985). In this study, using (RA) weeds were ranked according to three indicators, those of relative frequency, relative uniformity, and average relative density (Thomas, 1985). (My colleagues and I., 2008) have ranked weeds using the Abundance Index (AI) so that the absolute values of the three indicators could be used for information on uniformity and average density (Minbashiet, 2008). (Keshavarzekal, 2008) documents the spread and dominance of weed species in wheat fields of Kohgiloye and Boyer-Ahmad Province that identified 27 species of weed from 13 plant families and the weed *Gallium tricornuthm* was found to have the highest frequency, uniformity in distribution and density per unit area. Wheat and barley in Surrey, belonging to 9 families, 22 species of weed plants was reported (Yadaniemal, 2008). One common method for studying the diversity of plant communities in weed ecology, is with the Shannon-Wiener Index. This index identifies the most abundant species and the relative abundance of species. The index is based on the abundance of a variety and large numbers of shows (Poggio, et al., 2004). As wheat is important both for human and livestock nutrition, and weeds are a factor that cause damage to wheat crops, the identification and study of weed diversity and density is essential information for the weed management. Therefore, this study was conducted in 2011 to assess and determine the diversity, density and predominance of weeds in wheat fields of Khuzestan province.

MATERIALS AND METHODS

Khuzestan Province is in south-western Iran, it covers an area of 63633.6 km² between latitudes 29º-33º 0' 57'' N and longitudes 47º 40' - 50º 33' E. The climate of the province is affected by weather systems from the Mediterranean and the Persian Gulf so that the weather is typically that of a semi-arid/temperate climate. During the 2 years of this study 30 wheat fields were selected randomly from the province. Samples were taken after the wheat heading stage during the second week and sampling began in cities of the northern region of the province. W systemic sampling method was used, as proposed by (Cooley, et al., 1991). The main points taken for sampling intervals were steps of 20 W. To increase the precision of sampling no weed was ignored, Sub-samples were also taken at 5 to 10 meter radius from the main points of sampling, they were randomly selected to sample the real condition of plant species diversity in the fields. In fields of 1 to 3 ha, 5 points taken from 20 steps on the path W were selected. Farms of 4 to 7 ha, 9 points were taken from distances of 40 steps along the path. In fields bigger than 7 ha 13 points were taken for sampling. Within each quadrant, weed species and
numbers of weed species were counted. Using the following equations, frequency, consistency and mean species densities were calculated.

Frequency (F) represents an entire field with its specific weed species and is expressed as a percentage.

\[ F_K = \left( \frac{\sum Y_i}{n} \right) \times 100 \]

Where:
- \( F_K \): the frequency of \( K \)
- \( Y_i \): presence (1) or absence (0) species \( k \) in field \( i \)
- \( N \): number of farms visited

Uniformity (u) quadrant represents the percentage of stained sample, such that \( K \) is an estimate of the space occupied by a weed.

\[ U_k = \left( \frac{\sum \sum X_{ij}}{M_i} \right) \times 100 \]

Where,
- \( U_k \): uniform field for the \( K \)
- \( X_{ij} \): the presence (1) or absence (0) as \( K_i \) in quadrant \( j \) ranch
- \( M_i \): number of farms in the quadrant \( i \)

Density (D) indicates the number of individuals per square meter.

\[ D_{ki} = \left( \frac{\sum Z_j}{M_i} \right) \times 4 \]

Where,
- \( D_{ki} \): the density of species \( k \) in field \( i \)
- \( Z_j \): number of species \( j \) in the box

Average Density (MD) represents the average number of plants per square meter in a field.

\[ MD_{ki} = \left( \frac{\sum D_{ki}}{n} \right) \]

Where,
- \( D_{ki} \): density in each field
- \( n \): total number of farms surveyed

The uniformity of weed in every city, Whatever the number obtained To zero to indicate the intensity non-uniformity Or being a dominant species in the weed community But whatever the number obtained by a desire to help The uniformity of the community (Maximum species diversity and dominance of a particular weed species) are.

**RESULTS AND DISCUSSION**

Results from tests on 30 samples from wheat fields of Khuzestan over 2 years showed that the cities of Masjed Soleiman, Izeh and Baghmlk had less plants per square meter with densities of 20/82, 22/17 and 22/18, respectively and the cities of Dezful, Shushtar and Gutvand with 91/71, 85/61, 82/97 plants/m² had higher weed densities (Figure 1).

![Fig. 1: Density of weeds (plant/m2) in wheat field of Khuzestan.](image-url)
In this study, 124 species of weeds from 36 plant families were identified. (Ramak maassouni, 2008; Khatamsaz, 2002; Assadi and Grieve, 2001). Of these, 91 species and 77 species were present in more than three farms in the city (Table 1). The plant families Asteracea, Brassicaceae, Poaceae, Fabaceae with respective weed densities of 21, 15, 9 and 5 different species had in total 52.97% of the total weed species (50 species, out of the total weed species of 124) (Figure 2).

**Fig. 2:** Plant families and percentage of weeds in these families in wheat fields of Khuzestan province.

Studies of species diversity show differences between the cities; Dezful, Shushtar and Gutvand demonstrated larger species diversity 63, 57 and 52 respectively and lower diversity was recorded from the cities of Izeh, Baghmlk, Masjed Soleiman, respectively at 9, 18 and 19 (Figure 3).

**Fig. 3:** Diversity of weeds in wheat field of Khuzestan.

Life-cycles of the various species are presented in Figure 4. There were observations of 68 annual species, 47 perennial, and 8 species and 3 species of types of biannual in the wheat fields (Figure 4). Among the identified species, there were 102 species of broad-leaf weeds and 22 species of narrow-leaf weeds (Figure 4).

This study carried out in the wheat fields of Khuzestan province, in addition to high diversity, recorded a dominance of broad-leaf weeds, so that the predominant 24 weed species comprised of a split. However, the most dominant weed was single cotyledon spring oat (*Avena ludoviciana*) with the abundance index was 29/31 in No. 25. To weed out problems at the provincial level the Abundance Index (AI), provided by (Bashi et al., 2008) was used. The results of the calculation of this index showed that *Malva neglecta* was the predominant weed in wheat fields of Khuzestan province and wild mustard (*Sinapis arvensis*) artichokes pied (*Sylilbum marinum*), black mustard (*Brasica nigra*), vetch (*Vicias pp*), were located next in the rankings. Most dirt weed to weed and wild oat in Shushtar, Dezful, and Baghmlk was the least pollution. Most dirt weed to weed and wild oat in Shushtar Dezful Baghmlk was the least pollution.

Malva neglecta weed and wild mustard were also significant weeds in the wheat fields of the southern provinces, but their concentrations were less. In the areas of Izeh, (fields and mountains of the north), Baghmlk and Masjed Soleiman the weed of *Vicia Spp* was found to be the most abundant. In addition to identifying the various weed species prevalent in wheat fields, their densities and levels of distribution, the problem of weed interference in crops can be properly managed with a strategy to
reduce weed species using this information; especially to prevent the problem of the transfer of weeds from one region to another. This study that documents changes in weed patterns and densities in areas of Khuzestan, together with information on weather, climate and soil can make a good contribution to weed management that would be transferable to other areas.

Fig. 4: Weeds in wheat field of Khuzestan (life cycle & plant-type).

REFERENCES