Study on Ecological Characters of Weed Flora in the Maize Fields of Saveh Regions

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ABSTRACT

Identifying of weed in corn farms expressed as most basic action in weed management and usage of achieved information will help us integrated-management of control, herbicide consume reduction and production cost reduction. For this purpose in 2008 up to 120 hectares of 5000 hectares planted corn in 26 different regions in Saveh was selected, identified and sampling of weed species was done in during three times step according a same methodology. The result showed that there are up to 38 weed species from 16 herbaceous family that compete with corn in farms of different regions of Saveh, and species such as: Amaranthus sp, Portulaca oleracea, Hibiscus trionum, Convolvulus arvensis, Alhaja camel-rum, Heliotropium sp, Xanthium strumarium are of most important wide leaf species and Setaria sp, Echinocelea crus galli, Cyprus sp, Sorghum halepense are of most important narrow leaf species in corn farms in this region. Also the survey result in region showed that variety and density of weed in crone farms of different region in Saveh are vary so in Looin moor there is most variety (25 species of 14 herbaceous family) and in Sinak region and Ojagh moor placed in east of city, due of high PH condition of soil and water, there is minimum plant variety (11 species of 7 herbaceous family). It seem that more than PH of water and soil, different alternation of implant, the high of farms from sea level, variation in soil texture in farms and usage of different herbicides influenced on variety and density in an effective manner. With knowledge these agents in different farms, it may apply appropriate management for weed control so the density of weeds appear lower than threshold of economic loss.

Key words: weed, weed control, and weed species, cone field, and corn weeds.

Introduction

The recognition of weeds is considered as the most essential action in the agricultural products management. By being kept informed about the especial weeds in a region, it is possible to make decision regarding the methods of weeds controlling; otherwise, using different methods will not have suitable effects.

The environment becomes contaminated unwontedly in the chemical control, and even some of the weeds would be resistant to herbicides. The distribution and using of pesticides in the country should be according to accurate information about weeds flora of the region, and the efficacy of herbicides on the weeds species should be evaluated.

In order to identify the weeds of the wheat fields in Iran as the most substantial action in weeds management, Minbsahi et al. [7] evaluated the cultivation of water weat and the ampleness of farms according to land measurement in every township which is located in different provinces in the country.

Finally, using the existing relations, density (in area), frequency and uniformity of each species were obtained.

Latitude, longitude and altitude from sea level, measurements location were recorded by the GPS device in every field.

This information created the main layer (Coverage) of the plan.

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All collected data is designed in one database (in Access space), and after inputting and correcting them by designing a structure (Geodatabase) in software’s ArcView and ArcGis.

The data related to each province is placed in its own bank. So, in the weeds distribution map of watered-wheat fields of the country there are more than 400 weed species which belong to 44 herbaceous group, whose 74% of these species are placed in 7 herbaceous group.

Species of: Polygonum aviculare, Chenopodium album, Sinapis arvensis, Cardaria draba, Galium tricornatum, Acroptilon repense, Descurainia sophia were the most important broad-leaved weeds of irrigated-wheat fields. And species of: Convolvulus arvensis, Alhagi pesudalhagi, Cirsium arvense, Carthamus oxyacanthus,Glycyrrhiza glabra have been the most troublesome plant before irrigated-wheat harvest. All in all, the results represented that the management of the weeds of irrigated-wheat fields are not in good condition. But the management of the broad-leaved weeds is relatively more suitable than extend-leaved ones, and the management of troublesome plant of prior to wheat harvest is in the lowest level [7].

Jamnejad [4] studied the weeds of corn fields in region of Karaj, and came to this conclusion that common crop rotation is one the important factors and affects the weeds flora of each region. So that in Malek -Abaad region, in which vegetables cropping is common, it can be seen the most variety of weeds species. But in the region of Hashtgerd in which the rotation of wheat and corn is the dominant one, the least variety of weeds species is seen. In this study, while recognizing the dominant weed species in region of Karaj, the amount of damage of weeds, the impact of weed control methods including chemical control, mechanical, and understanding the impact of the time of corn planting on these factors were evaluated. For this purpose, five districts of corn planting were considered, and the dominant weed species of each region were identified and recorded.

In Reform and Supply of weed seedling of Karaj Institution also two dates - the first and fifteenth of July- along with eight treatments were studied. Supposed Traits in the study: Plant height, functioning in unit of area, biological function, stem diameter, grain weight in ear, weeds density, density of the broad-leaved and thin-leaved weeds, dry weight of pigweed(Amaranthus), dry weight of purslane weed (Portulaca oleracea), dry weight of: green foxtail weed(Panicum Viridis L.), and dry weight of (Echinochloa crus glli) weed. The weeds which had occupied over 50% of the total surface of the corn field were determined as the dominant species. In Total visits of farms, twenty six of thirteen weed species were identified; containing 9 & 5 species of weed ,Two of these thirteen species- Gramineae & composite- have been the dominant ilk in the field. From the twenty six observed weed species in the farm, eleven weed species were totally capable of reproducing by the asexual methods such as Rhyzum, stolon, and underground roots. Also among the observed weed species in the fields, over six weed species have enjoyed C4 photosynthetic system and the rest were eligible for C3 photosynthetic system [4].

In research conducted by Tabatabai’e et al [12] which was a five-year plan began from 1379, in order to prepare the distribution maps of wheat and barley weeds, the relative frequency, uniformity and density of the whole farm were used. The results of this study showed that the pollution in the extended and broad-leaved weeds have more variety in cold regions of the province [12].

Mir Kamaali [6] studied the weeds and their control in corn. According to him various weeds include: Annual dicotyledons such as pigweed, Chenopodium types, Solanum nigrum,Abiotlton theophrasti , ankles (Flower in an hour) (Hibiscus trionum), and permanent exogenous: Convolvulus arvensis types and Annual single-cotyleden (Grasses) (Echinochloa crus glli), (Setaria sp), Setaria viridis and Cynodon dactylon , Panjeh kutah, Artemisia annua and Ash and permanent exogenous: (Sorghum halepense), and ( Cyprus). Kamaali introduced them as troublesome weeds in corn farming [6]. Hossein Fatemi (1977) surveyed a four-year review of granular corn farms in regions of Bra’aan and Karaarej-Esfahan-in which there are corn cultivations. 18 weed species were identified, among which the species of Chenopodium album, barnyard grass (Echinochloa crus glli), Solanum nigrum, Convolvulus arvensis were in both regions, and Taj rizi and khorfeh just exist in region of Karaarej dominantly. [5]

In order to identify and determine the weeds density of corn fields in Qazvin province, Nikunaam et al [13] collected, identified and determined the frequency and density of weeds in 125 maize farms in the area of 14 thousand hectares.

The results showed that 31 weed species from 17 families had distribution in the maize plant of Qazvin province. (Amaranthus blitoides L) With 16/3%, Amaranthus retroflexus with 11/8% and millet (Setaria viridis L.) With 11/8% and Panyrak (Malva neglect wallr) and (Geranium tuberosu L.) With less than 5/0, respectively, had the highest and lowest percentage of relative frequency.

Also Datura (Datura stramonium L.) With 21/2% and purslane with 14/3% (Euphorbia helioscopic L.) With 0/1% and (wall) with 0/17%, enjoyed the highest and lowest relative density [8].
Shroyder et al [11] identified the distribution and the frequency of the most important weeds in farming products by collecting data from 26 European countries. In addition, they mentioned the resistance of a few weeds species to some common herbicide during the study [11]. In another study, Thomas and Donalgy [13] determined the Distribution of the one-year vernal crops weeds during three years in seedling stage and noted a decisive change of the emergence and dominance of considerable numbers of weeds species in their study. [13].

Thomas [14], in another study, has determined the population structure of weeds in vernalization crops. And the compatibility of the weeds was also compared to the changes of climatic factors. The precipitation and the temperature were presented as the most important factors in determining the distribution pattern of the weeds. [14].

Examining the weeds community in cereal and oilseeds over 4 years, Dale and Thomas [14] considered the presence of 40 weed species in crops under different soil and climatic conditions by using cluster analysis methods. They related the changes in different weed species mainly to the soil type and climate. [2]

Frick and Thomas [3] represented that the rise and dominance of different species of weeds were strongly influenced by changing conditions and environmental factors and crop management during 1897-1960. [3]. Coupling and Webster [15] reported that during the examination of the south of U.S.A weeds which lasted 22 years (1974-1995), two species (Cynodon dactylon and Sena obtusifolia) had been dramatically expanded. And three species (Digitaria spp and Xanthium strumarium and Sorgum halepense) had been reduced; while the species such as Cypreus and Ipomoea Spp have not been changed and remained as the dominant weeds [15]. Savdra et al [10] affirmed in their study that the soil texture had a significant effect on the weeds flora, while the effect of PH and the amount of soil’s carbonate were negligible. However, the climatic factors had left little impact on the presence or absence of the weeds species [10].

Materials and methods

Location and Geographical Position of Saveh:

The city of Saveh is located in southwest of Tehran in longitude 50/20 eastern degree and in latitude 35/18 northern degree and at an altitude of about 1050 meters above sea level, and is surrounded by the cities of Karaj and Qazvin from the north, Tafresh and Qom from the south, Rey and Qom from the east, and Hamedan province from the west and 120 KMs away from Tehran. Due to proximity to a central desert, Saveh’s climate is subtropical. Its average annual temperature is around 18 degrees Celsius and its maximum temperature in August is 8 / 38 ° C. The long-term average rainfall which is recorded in this region is about 206 mm per year and its predominant crops are: wheat, barley, corn, forage plants, patch, grains, and potato, onion and fruit orchards.

Sampling Procedures:

Sampling of each selected farm includes three-stages:

1- From exiting the herb till setting up (crop’s height of 25-35 cm).
2- Appearance of male thyrsu (Tassle) in crop.
3- The stage when the seed becomes milky to when the seed of farming plant is under physiologic supervision.

In the first step, because of shortness of corn, box setting up and sampling was possible and done by 100 * 50 cm boxes. For the second and the third steps 50×50 cm boxes were used. For this purpose, the number of the boxes of the 2nd and 3rd step was doubled and the relevant statistics were recorded.

Registration Method:

First of all the farm is visited and all the observed species are identified and recorded. Field borders, streams track, and traffic rout in the field are surveyed and the observed weeds are recorded separately.

For this purpose table (4-3) is designed in which all the characteristics of weeds species, growth stages, field margin grasses, rotation, maize's figure, consumed pesticide, fertilizers and other necessary instances were collected and recorded during sampling.

Setting Box Method:

According to farm size and amount of uniformity, growth and distribution of weeds, segmented fields and the number of zigzag, cross, stepped, or accidentally paths for the quadrate in each plot were determined. According to the growth and height of the corn, these methods were used for all the farms the same. To this end, setting box was done from the field margin within distance of 5 meters through the field and in zigzag, crisscross, and at random paths in the first stage. As the corn becomes higher in the second and third stage, in order to survey and box setting, the stairway path was selected and done. Total quadrate thrown in every piece fits in the size and extent of the area and two quadrates was thrown per hectare.
As the quadrate dimension becomes smaller in the second and third stages of sampling, four quadrates were launched and the data were recorded per hectare. After launching and location of the test, all the available plants in the quadrate become separated and recorded according to the available weeds species in the quadrates. And their dominant vegetative stage is determined and recorded. Inserting a code into the desired species, those weed species which could not be identified in the sampling location are counted and recorded. And a sample of it is placed in a 30 × 35 cm plastic bag. They are identified and recorded by Research centers of pests and diseases, weeds Research Department or the relevant professors. The narrow leaves are identified by auricula, ligula, hair, and other apparent characteristic of the plant. In required occasion, the samples are recorded and identified by digital cameras.

The Dominant Weeds in Different Areas:

Chart (27-4) shows the dominant species (weeds density which are over 50%) in the maize field of different region separately. Meanwhile, as a kind of weed, the wheat, which is dominance over other weeds species in three regions: Oujan, Dasht-e-Ojagh, and Saaleh Abaad, is because of loss of the combine harvesting and being the previous culture, is not considered troublesome like the weed Keraan (Cressa Cretica) regarding the importance and development in region Sinak2, because it remains underdeveloped and weak along with the fast growth and suitable cover of the plant.

Conclusion and Discussion:

Studying the charts of 26 enumerated regions, there were more than 38 different species among the identified weeds in which the species: Alhaji, camel-r Amanthus sp Portulaca, oleraceae, Hibiscus trionum, Xanthium Heliotropium Strumarium, Convolvulus arvensis, sp are one of the most important broad-leaved weeds, and the species Setaria sp, Echinochloa crus galli, Cyprus sp, Sorghum halepense are one of the most troublesome thin-leaved in the maize field. The results correspond to A’yeen [1], Rezaakhanlu et al [9], and Nekunam et al [8].

Studying the research results and the charts of different regions {(1-1) & (1-2)}, three regions with relatively equal characteristics can be distinguished.

Region One:

The fields like Sinak 1, 2, 3, and the districts which are adjacent are the low-heighted districts in this city which is located in the most eastern part and adjacent to the city of Qom’s fields, and it lacks the appropriate drainage, the fields soil texture of these districts are relatively onerous and are benefited from high electrical conduction of the water and the soil; as a result, the variety of weed species is less than other districts of the city and could not be more than 4 species in the fields of Dasht-e-Ojagh and 9 species in the fields which had been more cultured. The density of the weed species is low per meter square, and is insufficient in chemical fight, meanwhile, some of the weed species such as khaar Shotor, Karaan (Cressa Cretica), Jaghjagheh (Prosopis), which are so resistant to unfavorable conditions of water and soil, are the reagent of special conditions of these districts in the fields of these regions. The results are correspondent to Frik and Thomas [3] and Deil and Thomas [2] which have related the variations in different weed species mainly to the soil and the climate.

If we suppose the costs of the spraying by the weeds in pre-eruption stage for every hectare of corn 500000 Rials in crop year 1387 (including buying Aradikaan poison, spraying, and disk), because these regions do not need to spray, this amount of production costs is reduced and while soil cultivating of shrub’s basis, the operation of the cultivator between the culture’s rows controls few of the weeds.

Finally, by guidance and recommendation of corn growers of these regions to take soil samples of the fields, soil texture, and electrical conductivity, the extract of the soil and water saturation can be studied before culturing. As well as making recommendation about fertilizer, doing or not doing the pre-eruption chemical fight is evaluated.

Region Two:

Unlike the region one, this region has a maximum of weeds density and variety in the corn fields. 25 different species of 14 plant groups and on average, 15 plant species were collected in the samples. The graphs (1-2), include the farms: Dasht-e-Louyin and adjacent farms which is located in 35 kilometers West of Saveh. The soil of these farms has sandy and clayey texture soil, appropriate drainage, and their conditions are better than region one regarding the salinity of water and soil.

Height of this region field is 200-300 meters more than central plain (Dasht-e-Markazi) in proportion to sea level, and has brought about cooler weather conditions and affects the weeds flora of the region. The results correspond with the researches of Thomas [14] Tabatabaayi et al [12] and Rezaakhanlu et al [9].

Time of corn germination after planting in this region is posterior and the consideration time of the end of season is shorter.
That is why farmers of these regions, contrary to the central plain of Saaveh, do not have possibility of corn planting immediately after the grain harvest during one year. Therefore, corn planting is done after autumn and winter fallow in early spring, and generally is performed with the aim of seed harvesting. It is provided a perfect condition for the growth and seed-giving of the weeds and increasing of seed bank of the weed in the fallow time (before corn planting).

Region Three:

Most of the maize fields are minus the central plains of region one, and include nearly 60 percent of the maize fields of this city. After the cereal harvest, water and soil conditions, and appropriate climate make the corn cultivation immediately possible for farmers in a year.

The density of dominant and important weeds in region three is shown in table (1-5).

High densities of such weed species and impossibility of farming and mechanical fights during fallow time (prior to corn planting), as it stated regarding region two, chemical fight of the pre and post-eruption to weeds, along with cultivation operation is required to make the weeds density reach to a point under economic threshold.

It should be noted that the farmers of these regions have used Araadikaan poison for pre-eruption fight, and used 2,4D poison for broad-leaved of corn post-eruption over 15 years. Because of the cultivation restriction of crops which are after the corn (usually autumn grain) other pre-eruption herbicides such as Atraazin, and Laasu, were not practical. Seemingly, a kind of resistance to pesticides has been formed in the aforementioned species; therefore, in order to apply more efficient management regarding usage of effective herbicides, it is necessary to collect the seeds of such weeds and transfer them to the laboratories in which the resistance of herbicides is examined.

![Fig. 1-1: Density and dominant weeds in different regions.](image1)

![Fig. 1-2: Density, variyans and number of weeds in corn fields in Dashte looin region.](image2)
Table (3-4): Field’s characteristics and data

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Details</th>
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<tr>
<td>Sampling Date</td>
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<tr>
<td>Owner: Consumer herbicides</td>
<td></td>
</tr>
<tr>
<td>Consumer Pesticides</td>
<td></td>
</tr>
<tr>
<td>Area: Maize growth stages</td>
<td></td>
</tr>
<tr>
<td>Region: last cultivation</td>
<td></td>
</tr>
<tr>
<td>Herbicides used in previous years:</td>
<td></td>
</tr>
<tr>
<td>Other operations (cultivator)</td>
<td></td>
</tr>
<tr>
<td>Field margin's weeds</td>
<td></td>
</tr>
<tr>
<td>Sampling Number:</td>
<td></td>
</tr>
</tbody>
</table>

Table (1-5): The density of dominant and important weeds in region three is shown in

<table>
<thead>
<tr>
<th>Density of weed shrub per hectare</th>
<th>Region</th>
<th>The species of weed</th>
<th>No</th>
</tr>
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<tbody>
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<td>1000000</td>
<td>Labar</td>
<td>Hibiscus trionum</td>
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<tr>
<td>500000</td>
<td>Olusjerd</td>
<td>Echinocloa crus galli</td>
<td>2</td>
</tr>
<tr>
<td>450000</td>
<td>Sorkhdeh</td>
<td>Cyprus sp</td>
<td>3</td>
</tr>
<tr>
<td>420000</td>
<td>Huseynabad</td>
<td>Portulaca oleracea</td>
<td>4</td>
</tr>
<tr>
<td>380000</td>
<td>Huseynabad</td>
<td>Setaria sp</td>
<td>5</td>
</tr>
<tr>
<td>70000</td>
<td>Sorkhdeh</td>
<td>sp Heliotropium</td>
<td>6</td>
</tr>
<tr>
<td>45000</td>
<td>Olusjerd</td>
<td>Convolvulus arvensis</td>
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References