Appraisal of various floral species biodiversity from Iskandarabad, Pakistan

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Abstract: The present study was conducted at ten different sites; Site 1 (cotton field irrigated by sewage water), Site 2 (wheat field with citrus trees irrigated by sewage water), Site 3 (wheat field irrigated with fresh water), Site 4 (cotton field irrigated by fresh water), Site 5 (wheat crop near railway track; irrigated with sewage water), Site 6 (barren land; waste water of Pak – American fertilizers factory id disposed here), Site 7 (cotton field irrigated by waste water of Pak – American fertilizers factory), Site 8 (undisturbed land with wild plant species growing), Site 9 (botanical garden and park), Site 10 (barren land near maple – leaf cement factory) in Iskandarabad located in North east of Mianwali city. The study was done on the seasonal basis and the results showed diversity for all sites. The study revealed occurrence of *Anagalis arvensis, Dactylotenium aegyptium, Cynodon dactylon Oxalis corniculata*, *Acacia Arabica, Amaranthus viridis, Euphorbia pilulifera*- species of plants to be found in abundance. Vegetation found there, was denser in mild winters as compared to summers because of dry, hot climate. Drought was found commonly. In winters Absolute frequency of vegetation is maximum 100% and minimum is 10%. Relative frequency is maximum 20% and minimum is 1.42% in all 10 sites. In summers Absolute frequency is maximum 90% and minimum is 10%, Relative frequency is maximum 19.51% and minimum is 1.12% in all 10 sites. In addition to the floristic composition, soil and water analysis of the sites was also done. Loamy soils are the best for crops which is common in that area.

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Key words: Biodeiversity, absolute frequency, floristic composition, soil and water analysis.

1. Introduction

Biodiversity crisis on global scale has given rise to a growing concern at the prospect of rapid decrease of species, populations, domesticated varieties, medicinal herbs and natural habitats. Recent estimates suggest that more than half of the habitable surface of the planet has already been significantly altered by the human activity (Hannah and Bowles, 1995) and we are on the verge of mass extinction of the species (Wilson, 1985). Many conservation biologists have warned that 25% of all species could become extinct during next 2 or 3 decades. There are numerous reasons for the loss of biodiversity but most important is the loss and fragmentation of natural habitats. Biological diversity implies the variety of living organisms and includes diversity within species, between species and of ecosystems and the ecological processes of which they are a part (Gaston and Spicer, 2004). Species diversity is considered to be one of the key parameters characterizing ecosystems and a key component of ecosystem functioning (Hutchinson, 1959; Schulze and Mooney, 1994; Larsson, 2001; Loreau *et al*., 2002; Scherer-Lorenzen *et al*., 2005; Saira *et al*., 2015; Yusra *et al*., 2015). Globally, biodiversity is changing at an unprecedented rate as a complex response to several human-induced changes (Vitousek, 1994; Hooper *et al*., 2005). These changes in biodiversity accelerates numerous concerns as it plays a significant role in maintain a balance in various ecosystem properties like recycling of nutrients, decomposition rates, productivity, resistance and resilience to perturbations (Loreau *et al*., 2001 and Mobeen *et al*., 2015). Therefore, biodiversity should be preserved. The structure of plant as well as animal communities in many natural ecosystems is greatly influenced by the disturbances, frequently occurring in the system naturally or due to anthropogenic activities (Armesto and Pickett, 1985; Bennett and Adams, 2004; Eldered and Doak, 2006; Kwit and Platt, 2003; Qurat-ul-Ain *et al*., 2015; Qamar *et al*., 2015). In many of these systems, disturbances change overall community structure (Shaforth *et al*., 2002; Sousa, 1979) and this may lead to change in population dynamics and affect community adversely. Studying vegetation and various environmental factors (e.g. physiographic, climate, soil, water, etc.), the community stability and the factors correlation with the vegetation can be reached, which is crucial in terms of plants conservation, forest communities development and rehabilitation (Basiri, 2003; Harrem *et al*., 2015; Sadia *et al*., 2015; Saeed *et al*., 2015).

Iskandarabad is situated in North east of Mianwali city whereas Mianwali is a district in the northwest of Punjab province, Pakistan. It is a small town of Mianwali district housing about six hundred houses. Not much work had been done in this area in regards of vegetation and other environmental factors. A number of vegetation types have been recognized; based on habitat, form and density of dominant species, though the vegetation patterns are controlled by such factors as habitat, exposure to sunlight and altitude, besides biotic factors. Anthropogenic disturbances also affect the vegetation to a great extent. It is therefore imperative to conserve the herbaceous vegetation of Iskandarabad. In this context, the present study was therefore conducted to access the seasonal variations in phytodiversity and prevalence of various plant species in the selected sites. Hence, a detailed floristic inventory of Iskandarabad is developed.

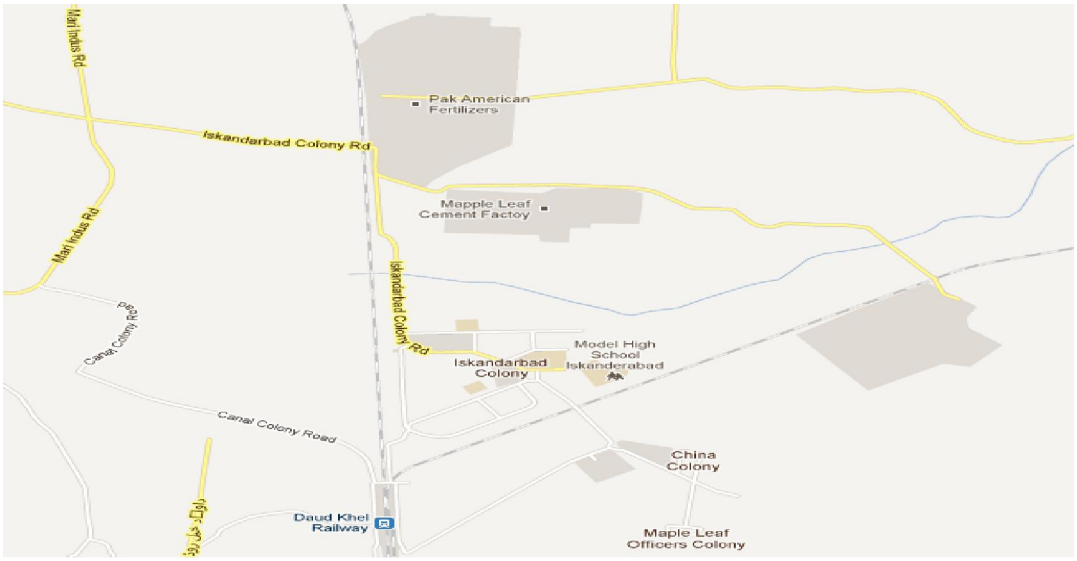


Fig: 1.1 Map of Iskandarabad

2. Materials and Methods

2.1. Seasonal Surveys:

Visits were done to the area under study in four different seasons; viz spring, summer, autumn and winter. In these visits; different plant species were observed and variation in species was according to climate and weather, specie growth, type of soil and its conditions. Results are discussed in two groups that is plant species found in spring/summer and autumn/winter.

2.2. Sampling Site:

Total area to study is 1000 canals, most of it is under agricultural practices and other area has colony, botanical garden and some of it is undisturbed and barren land regarding vegetation and soil conditions. The whole area was divided into ten sites or fields according to their vegetation, soil condition and water given to these sites.

Site 1: It was under agriculture practices, cotton was cultivated there. This area was given sewage water of colony.

Site 2: This site is also under agricultural practices, it was field of wheat crop along with citrus trees cultivated in the field randomly. The area was given sewage water or waste water of colony area.

Site3: Here wheat crop was cultivated and the area was given fresh water from tube well sucked by boring machine.

Site 4: It was a cotton field and the area was given fresh water from tube well.

Site 5: It was under agricultural practices but unlike other sites; this area was very near to the main sewage water tank of colony which is close to railway track. The site was under wheat cultivation and irrigated with sewage water.

Site 6: This site is not under agricultural practices but in past it was and it was a citrus garden. Now it's a barren land and waste water of factory (Pak – American fertilizers) is disposed-off here.

Site 7: This area was in front of factory (Pak – American fertilizers). Cotton is cultivated here. Waste water of factory is given to this land.

Site 8: This area is a part of colony site but not under any agricultural and gardening practices. It is totally undisturbed land with wild species of plants and grasses.

Site 9: This area is within colony a residential area and artificial plantation is done here as in form of botanical garden and park for women and children.

The area was given fresh water of river Indus which is also used for drinking purpose.

Site 10: This area is near cement factory (maple – leaf cement). It has no agricultural practices neither ornamental plantation. It is mostly barren land near gypsum hills and it has wild natural vegetation. Rain water is only source of irrigation for this site.

2.3. Quadrate Method:

Sampling was done by using quadrate method. Quadrate used was a square frame, with size $1m^2$ (Sharma *et al*., 1983; Rajvanshi *et al*., 1987). Ten quadrates were thrown at each site randomly and sampling of was done. Specimen of plant species encountered at each site during the study period were collected and herbarium was prepared and identified.

2.4. Water and Soil Sampling:

Water samples were taken from different places which were given to different sites according to their location and crop requirement, as waste water of colony site (residential area), fresh water comes from river Indus (tube well), waste water of factory (Pak American fertilizer). From each site three replicates were taken and mixed together to take one representative sample.

Similarly soil samples were taken from different sites which were differentiated on the basis of water types given for irrigation of crops. For soil samples Z scheme was followed and from each point 3 replicates were taken. 3 replicates were mixed together thoroughly and then one sample was taken from that homogenized soil. Distance between points from where replicates were taken was 2 feet and distance of two sampling sites was 15 feet. These samples were brought and their chemical and biological analysis were done by soil and water laboratory for research, (Agriculture Department, Government of the Punjab) Thokar Niaz Baig Lahore.

2.5. Statistics:

The vegetation data recorded was quantitatively analyzed for Prevalence, Absolute Frequency (AF) and Relative Frequency (RF) is calculated and graphs are developed by using Microsoft excel. Formulas used are given below:

Prevalence (%) = No. of sites in which a specie occurs/Total no. of site × 100

AF(%) = No. of quadrates in which a specie occurs/Total no of quadrates × 100

RF(%) = AF value for a species/Total AF values for all species × 100.

3. Results and Discussions:

Forty five various species belonging to twenty nine families were recorded from 10 different sites of Iskandarabad.

3.1. Prevalence

In area 1 absolute frequency %age ranges from maximum 100% to minimum 10%. (*Anagalis arvensis, Dactylotenium aegyptium*) appears 100% and (*Casuarinae quisetifolia, Malvarotun difolia*, *Pullicaria crispa* and *Trianthemam onogyna*) appears 10%. In area 2 AF %age ranges from 90% (*Cynodon dactylon*) and 10 % (*Amaranthus viridis*, *Euphorbia pilulifera*). In area 3 AF %age ranges from 100 % (*Cynodon dactylon*) and 10 % (*Solanum nigrum, Amaranthus viridis*). In area 4 AF %age ranges from 100 % (*Dactylotenium aegyptium, Cynodon dactylon*) and 10 % (*Peganum harmala*). In area 5 AF %age ranges from 80 % (*Cynodondactylon*) and 10 % (*Calotropis procera*). In area 6 AF %age ranges from 70 % (*Oxalis corniculata*) and 10 % (*Chenopodium album*). In area 7 AF %age ranges from 70 % (*Dactylotenium aegyptium*) and 10 % (*Anagalisarvensis*). In area 8 AF %age ranges from 80 % (*Cynodondactylon*) and 10 % (*Trifoliumm argius, Solanum nigrum, Peganum harmala*). In area 9 AF %age ranges from 50 % (*Cynodon dactylon, Oxalis corniculata*) and 20 % (*Cypress sp. Amaranthus viridis, Chenopodium album*). In area 10 AF %age ranges from 50 % (*Acacia Arabica*) and 10 % (*Amaranthus viridis*, *Cynodon dactylon*, *Dactylotenium aegyptium*, *Fagonia critica*, *Kochia indica*, *Nerium oleander*, *Sacchrum munja* and *Sorghum halepense*) (Saira *et al*., 2015; Yusra *et al*., 2015; Mobeen *et al*., 2015; Saeed *et al*., 2015).

3.2. Absolute frequency

Absolute frequency and Relative frequency of all weed species according to seasons autumn, winters, spring and summers divided in two categories for Iskandarabad. In area 2 %age absolute frequency (AF) ranges from maximum 80% (*Cynodon dactylon*) to 10% (*Triticum aestivum*, *Ranunculus muricatus*, *Malvarotun difolia*). In area 3 AF %age ranges from 80% (*Cynodon dactylon*) to 10% (*Triticum aestivum*, *Solanum xanthocarpus*, *Lathyrusaphaca, Fagonia sp.*). In area 5 AF %age ranges from 90% (*Euphorbia helioscopia*) to 10% (*Veronica sp.*, *Inulavestita*, *Fumariaindica*) In area 6 AF %age ranges from 60% (*Solanum nigrum*) to 10% (*Euphorbia helioscopia*). In area 8 AF %age ranges from 80% (*Cynodon dactylon*) to 10% (*Trifolium margius*, *Solanum nigrum*, *Peganum harmala*, *Malvastrum tricuspidetum*). In area 9 AF %age ranges from 70% (*Oxalis corniculata*) to 20% (*Chenopodium album*). In area 10 AF %age ranges from 50% (*Malvastrum tricuspidetum*, *Acacia Arabica*) to 10% (*Suedafeutreora*, *Sorghum halepense*, *Solanum xanthocarpus*, *Sacchrum munja*, *Nerium oleander*, *Kochia indica*, *Dactylotenium aegyptium*. The higher population frequency indicated that the soil and environmental conditions are favorable for the development of flora (Saira *et al*.,

2015; Yusra *et al*., 2015 and Sadia *et al*., 2015; Qamar *et al*., 2015).

3.3. Relative Frequency

In area 1 relative frequency (RF) maximum %age ranges from 14.28% (*Anagalis arvensis*) to minimum 1.42% (*Malvarotun difolia*, *Trianthemam onogyna*). In area 2 RF %age ranges from 16.39% (*Amaranthus viridis, Euphorbia pilulifera*) to 3.27% (*Malvarotun difolia*, *Polygonum plebejum*). In area 3 RF %age ranges from 17.85% (*Cynodon dactylon*) to 1.78% (*Solanum nigrum, Amaranthus viridis*). In area 4 RF %age ranges from 19.60% (*Dactylotenium aegyptium, Cynodon dactylon*) to 1.96% (*Peganum harmala*). In area 5 RF %age ranges from 13.55% (*Cynodon dactylon*) to 1.67% (*Calotropis procera*). In area 6 RF %age ranges from 14.58% (*Oxalis corniculata*) to 2.08% (*Chenopodium album*). In area 7 RF %age ranges from 14% (*Dactylotenium aegyptium, Cynodon dactylon*) to 2% (*Anagalis arvensis*)In area 8 RF %age ranges from 20% (*Cynodon dactylon*) to 2.5 (*Trifolium margius, Solanum nigrum, Peganum harmala*). In area 9 RF %age ranges from 12.82% (*Oxalis corniculata, Convolulusarvensis, Cynodondactylon*) to 5.12% (*Amaranthus viridis,Chenopodium album, Cypressp*). In area 10 RF %age ranges from 15.62% (*Acacia arabica*) to 3.125% (*Sorghum halepense, Solanum xanthocarpus, Sacchrum munja, Nerium oleander, Kochia indica, Fagonia critica, Dactylotenium aegyptium, Cynodon dactylon, Casuarina equisetifolia*).

In area 2 RF %age ranges from 13.11% (*Cynodon dactylon*) to 1.63% (*Triticum aestivum*) In area 3 RF %age ranges from 13.79% (*Cynodon dactylon*) to 1.12% (*Croton spariflora*) In area 5 RF %age ranges from 16.07% (*Euphorbia helioscopia*) to 1.78% (*Veronica sp.*) In area 6 RF %age ranges from 12.76% (*Solanum nigrum*) to 2.12% (*Euphorbia helioscopia*). In area 8 RF %age ranges from 19.51% to 2.43% (*Trifolium margius*, *Solanum nigrum*, *Peganum harmala*, *Malvastrum tricuspidetum*). In area 9 RF %age ranges from 17.5% (*Oxalis corniculata*) to 7.5% (*Rosa indica*). In area 10 RF %age ranges from 14.705% (*Acacia Arabica*, *Malvastrum tricuspidetum*) to 2.94% (*Dactylotenium aegyptium*, *Kochiaindica*, *Nerium oleander*, *Sacchrum munja*, *Solanum xanthocarpus*, *Sorghum halepense*, *Sueda feutreora*). The similar results were reported by various researchers, Harrem *et al*., 2015; Saira *et al*., 2015; Sadia *et al*., 2015; Mobeen *et al*., 2015; Qurat-ul-Ain *et al*., 2015; Saeed *et al*., 2015 and Yusra *et al*., 2015 while working with various species of *Euphorbia helioscopia, Solanum nigrum, Sorghum halepense*, *Sueda feutreora Dactylotenium aegyptium*, *Kochiaindica*, *Nerium oleander*, *Sacchrum munja* and *Solanum xanthocarpus.*

3.4. Soil Analysis

Increasing concern for the sustainability of our natural resources has led to the development of a more complex concept of soil health. Optimum respiration usually occurs around 60% of water filled pore space show good saturation and fine soil condition. Soil respiration will decrease under saturated or dry conditions. Biological activity doubles for every 18°F rise in temperature until the optimum temperature is reached Addition of organic materials will generally increase soil respiration. Organic matter provides the food or substrate on which heterotrophic soil microbes feed in sample 1 and 2 saturation is 0 means no biological activity is there and respiration rate is very low so typical soil activity is low. The pH scale ranges from 0 to 14 with a pH or 7indicating neutrality. Most compost has a pH between 6 and 8. In mineral soils, K generally ranges between 0.4 and 30 g kg-1 with most agricultural soils containing between 10 and 20 g kg-1. Total K contents in soils generally range between 10,000 and 50,000 kg ha-1 in the upper 0.2 m of the soil profile. Of this total K content, about 98% is bound in the mineral form and only about 2% is in the soil solution and exchangeable phases nitrogen, phosphorus and potassium are the main components determining yield and quality of intensive agricultural production particularly at undercover production, however; excessive fertilization has some environmental and economic consequences (Basiri, 2003; Harrem *et al*., 2015; Sadia *et al*., 2015; Saeed *et al*., 2015).

3.5. Water Analysis:

Table 4, shows all samples are fit for irrigation purposes except sample 3 which is Medium-fit due to high Carbonate content(2.0) as compared to other samples because Bicarbonate and carbonate ions combined with calcium or magnesium will precipitate as calcium carbonate($CaCO_3$) or magnesium carbonate ($MgCO_3$) when the soil solution concentrates in drying conditions. The concentration of Ca and Mg decreases relative to sodium and the SAR index (4.1 in this case) will be bigger. This will cause an alkalizing effect and increase the PH. Therefore when a water analysis indicates high PH level, it may be a sign of a high content of carbonate and bicarbonates ions (Basiri, 2003).

4. Conclusion:

On the basis of objectives of this project and thesis it is concluded that the vegetation of Iskandarabad was quite dense. The richness of plant species was remarkable. Certain species of some weeds and botanical plants got heavy percentage according to the soil conditions and weather. Population of certain trees and shrubs is found in very remarkable percentage. Average percentage was found

of some rare and endangered species of some certain weeds, shrubs, botanical plants and trees because of severe weather conditions especially summers were very severe hot and dry due to which less annual rainfall, drought conditions were faced by some species which were not drought tolerant. So, summers were not as much suitable for some species were found endangered and rare but mild winters had ideal conditions to survive for that species. But as mild winters were for very short time so species were categorized in endangered and rareness. Water availability for irrigation of plants and crops can also fulfill their requirements at its ideal annual growth. As different types of water was available according to the land, soil and requirement of crops. Sewerage water of colony area, waste water of Pak - American fertilizer factory and fresh water of river Indus was available. All types were individually perfect for crops and plants because sewerage water was highly rich in bio nutrients which were ideal for the growth of crops. Waste water of fertilizer factory was already rich in urea required by crops and plants. Fresh water was also good for soil. So weeds and some other botanical plants were in high population in those lands which were given sewerage water and waste water of fertilizer factory. Citrus trees had average population within agricultural lands. As natural environmental factors, weather conditions and water conditions were remarkable.

Table 1: Floristic list of plants of Iskendrabad Mianwali district

Plant Name	Family	Plant name	Family
Acacia Arabica	Fabaceae	*Euphorbia pilulifera*	Euphorbiaceae
Amaranthus viridis	Amaranthaceae	*Euphorbia prostrate*	Euphorbiaceae
Anagalis arvensis	Myrsinaceae	*Fagoniacritica*	Zygophyllaceae
Calotropis procera	Asclepiadaceae	*Fagonia sp.*	Zygophyllaceae
Casuarinae quisetifolia	Casuarinaceae	*Fumaria indica*	Fumariaceae
Cenchruspennise tiformis	Graminae	*Heliotropium sp.*	Boraginaceae
Cenchrusse tigerus	Poaceae	*Inulavestita*	Asteraceae
Chenopodium album	Amaranthaceae	*Kochia indica*	Chenopodiaceae
Convolulus arvensis	Convolvulaceae	*Lathyrus aphaca*	Fabaceae
Croton spariflora	Euphorbiaceae	*Malvarotun difolia*	Malvaceae
Cynodondactylon	Poaceae	*Malvastrum tricuspidetum*	Malvaceae
Cypress sp.	Cupressaceae	*Morus alba*	Moraceae
Dactylotenium aegyptium	Poaceae	*Nerium oleander*	Apocynaceae
Euphorbia helioscopia	Euphorbiaceae	*Oxalis corniculata*	Oxalidaceae
Peganum harmala	Nitrariaceae	*Solanum nigrum*	Solanaceae
Polygonum plebejum	Polygonaceae	*Solanum xanthocarpus*	Solanaceae
Pullicaria crispa	Compositae	*Sorghum halepense*	Poaceae
Ranunculus muricatus	Ranunculaceae	*Sueda feutreora*	Chenopodiaceae
Ricinus communius	Euphorbiaceae	*Trianthemam onogyna*	Aizoaceae
Rosa indica	Rosaceae	*Trifolium margius*	Tropaeolaceae
Sacchrum munja	Poaceae	*Triticum aestivum*	Poaceae
Sida cordata	Malvaceae	*Veronica sp.*	Plantaginaceae
Sisymbrin iris	Brassicaceae	*Withanias omnifera*	Solanaceae

Table 2: Floristic list of weeds of Iskendrabad Mianwali district

Species codes	Species names	Species codes	Species names
1	*Anagalis arvensis*	29	*Cenchruspennis etiformis*
2	*Dactylotenium aegyptium*	30	*Acacia Arabica*
3	*Amaranthus viridis*	31	*Sueda feutreora*
4	*Oxalis corniculata*	32	*Fagonia sp.*
5	*Cnicus sp.*	33	*Trifolium margius*
6	*Cynodon dactylon*	34	*Cypress sp.*
7	*Datura alba*	35	*Morus alba*
8	*Convolulus arvensis*	36	*Malvastrum tricuspidetum*
9	*Polygonum plebejum*	37	*Sacchrum munja*
10	*Malvarotun difolia*	38	*Rosa indica*
11	*Solanum xanthocarpus*	39	*Fagonia critica*
12	*Pullicaria crispa*	40	*Casuarinae quisetifolia*
13	*Euphorbia pilulifera*	41	*Sorghum halepense*

14	*Trianthemam onogyna*	42	*Sueda feutreora*
15	*Malvastrum tricuspidetum*	43	*Solanum xanthocarpus*
16	*Euphorbia helioscopia*	44	*Kochia indica*
17	*Solanum nigrum*	45	*Nerium oleander*
18	*Chenopodium album*	46	*Ricinus communius*
19	*Peganum harmala*	47	*Fumaria indica*
20	*Fagonia sp.*	48	*Withania somnifera*
21	*Calotropis procera*	49	*Ranunculus muricatus*
22	*Cenchrus setigerus*	50	*Sandacra didyma*
23	*Euphorbia prostrate*	51	*Veronica sp.*
24	*Heliotropium sp.*	52	*Inulavestita*
25	*Pullicaria crispa*	53	*Lathyrus aphaca*
26	*Heliotropium sp.*	54	*Triticum aestivum*
27	*Sida cordata*	55	*Sisymbrin iris*
28	*Cynodon dactylon*		
Species codes	**Species names**	**Species codes**	**Species names**

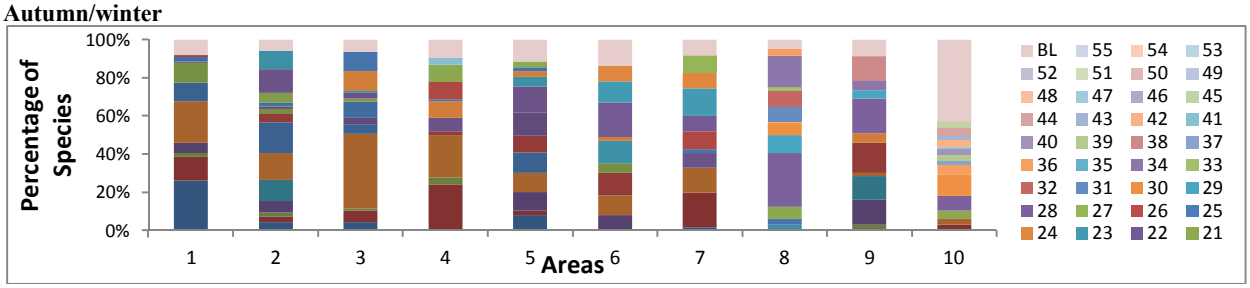
Table 3: List of weed species with their codes; set according to which quadrates were taken while random sampling from different sites of Iskandarabad

Sr. no	EC mS/cm 1:10	Ph 1:10	Organic matter (%)	Available phosphorus mg/kg	Available potassium mg/kg	Saturation (%)	Texture
1	31	7.6	0.7	3.5	318	0	soil is less
2	14.4	7.9	0.35	4.1	890	0	soil is less
3	1.7	7.9	0.42	3.9	820	52	Clay
4	2.7	7.8	0.7	3.1	137	36	Loam
5	1.4	7.9	0.42	2.9	224	28	sandy loam
6	2.6	7.9	0.28	3	304	38	Loam
7	1.4	7.7	1.05	4	118	36	Loam
8	1	7.9	1.05	8.4	251	36	Loam
9	2.2	7.8	0.7	3	177	32	Loam
10	1.1	7.9	0.98	3.1	407	44	Loam
11	3.1	8	0.7	2.4	323	42	Loam
12	7.1	7.8	0.35	2.9	66	28	sandy loam
13	1.5	7.8	0.98	2.7	247	28	sandy loam
14	0.8	8.1	0.7	3.4	256	28	sandy loam

Table 4: Soil of Iskandarabad had high fertility rate for crops such as wheat, rice, gram, maize, cotton. Soil was loamy and slightly clayey to loamy which was very fertile and highly rich in nutrients required by plants and crops. So, agricultural practices were at their best levels.

Sr. no	Electrical conductivity (μScm^{-1})	($Ca^{++}+Mg^{++}$) $meqL^{-1}$	(Na^{+}) $meqL^{-1}$	Carbonate (CO_3^{-}) $meqL^{-1}$	Bicarbonate (HCO_3^{-}) $meqL^{-1}$	Chloride (Cl^{-}) $meqL^{-1}$	Sodium adsorption ratio (SAR)	Residual sodium carbonate (RSC) $meqL^{-1}$	Remarks
1	3260	10.4	22.2	Nil	4.8	19.9	9.7	Nil	Fit
2	490	3.8	1.1	Nil	3.6	1	0.8	Nil	Fit
3	1198	5.2	6.6	2	4.8	4	4.1	Nil	Medium fit
4	413	3.7	0.43	Nil	3.4	0.5	0.32	Nil	Fit

Autumn/winter



Spring/Summer

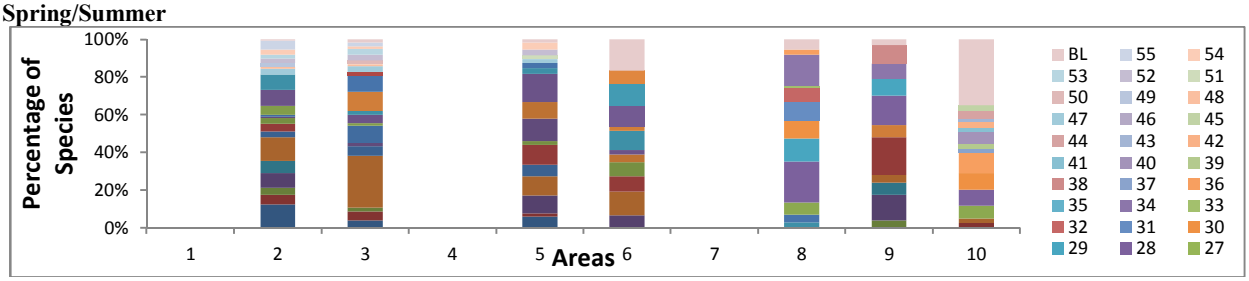
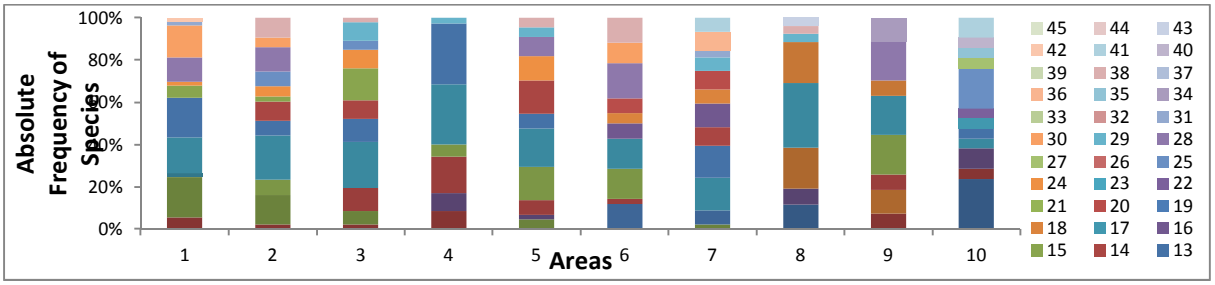


Figure. 1. Percentage of Species in Autumn/winter and Spring/summer

Autumn/Winters



Spring/Summer (site 1, 4 and 7 were leveled)

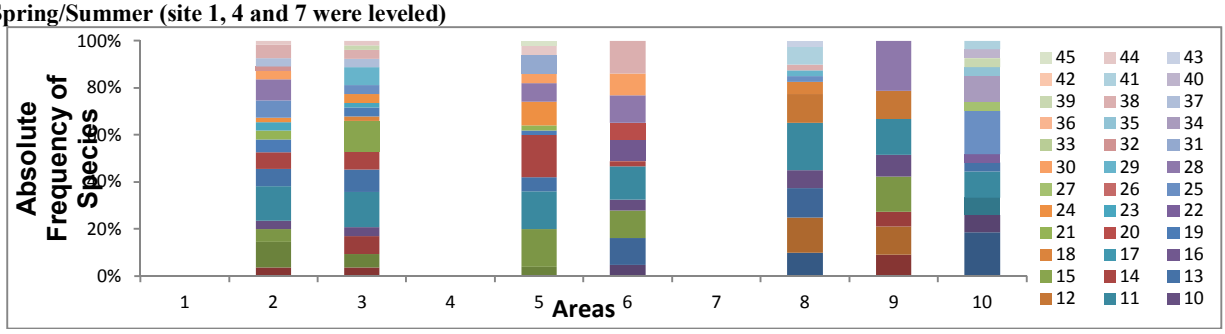
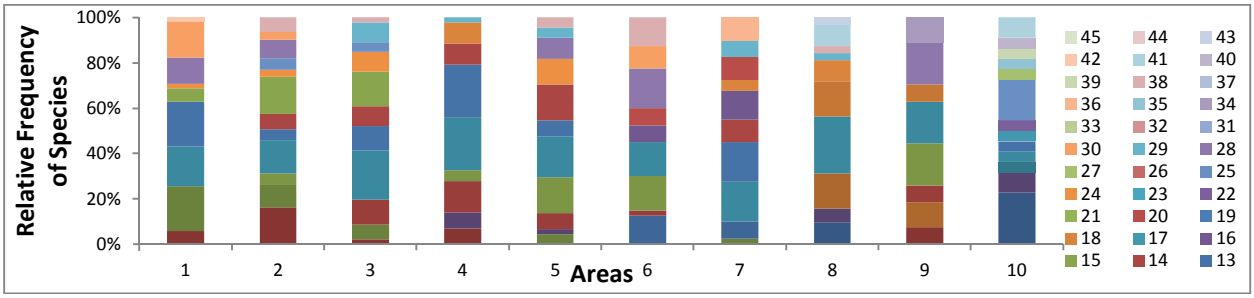


Figure 2. Percentage of Species in Autumn/winter and Spring/summer

Autumn/Winter



Spring/Summer (site 1, 4 and 7 were leveled)

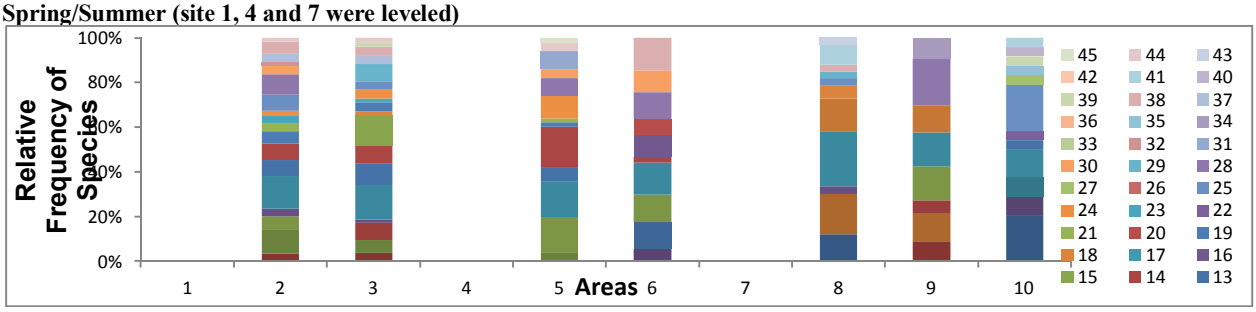


Figure. 3. Percentage of Species in Autumn/winter and Spring/summer

5. Recommendations:

As weather is suitable for certain species of plants so those species must be planted for more growth in order to increase the greenery and fertility of soil. Agricultural practices should and can be enhanced much more than present conditions because soil is highly fertile and highly rich in nutrients which are ideal for the remarkable growth of crops. So agricultural activities can be a very good source of money for poor people living there in small town; Iskandarabad; and as well as food. Many off season crops can also be harvested because of weather and water type available for irrigation and soil conditions. Many vegetables and fruits can also be grown in that area because of weather and soil condition. As the place is fulfill the requirements of many species of plants so it can be proved an ideal place for botanical garden. Botanical garden can have a good population of many ornamental plants because fresh water of river Indus is ideal for some ornamental plants. *Rosa indica* and many other flowering plants and can be a good source of scenic beauty of botanical parks for tourists. Landscape and horticultural practices can be done very efficiently for enhancing the greenery of parks. Trees like *Acacia modesta*, *Morusalba, Delbergiasisoo* have good population rate because of suitable environment, it can be a good source of wood as well as its fruit if plantation of these trees be increased. Many other trees, shrubs, herbs and weeds which medicinal many medicinal uses and ornamental uses can be grown in order to get a source of money. As bank of river Indus is very near to the area so a very ideal park can be developed for tourists as picnic or tourists spots, as fresh drinking water and a peaceful weather and environment is available.

Conflict of interest:

It is stated that all authors read and accepted the manuscript and have no conflict of interests. Further, the manuscript has not been published elsewhere, or is not in processing by any other journal.

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