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Survey of Asteraceae Family from Taif Saudi Arabia Peninsular

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Major constrain of crop production are weeds but they are also consider as important aspect of agricultural system in the world. Weeds are wild plants grow in an environment without the contribution of any human activities that that have positive or negative impact to the environment. The study aims at carrying a survey on weeds of family Asteraceae grown in cultivated environment with purpose of recording and identification. The study was conducted in the Taif region of Saudi Arabian kingdom in a mountain with an elevation level of (Area A = Al sail 1700 m, Area B = Al Wahat and Al Watit 1500, C = Leeih 1500, D = AL Gaim and Saisad 1500, F = E = Al Shafa 2200 m, F = AL Hada = 2000 m). The study was conducted between December 2018 to August 2019. The study was carried out based on enviromental survey. Diverse number of weeds were identified and collected from the examined study area. Results revealed aggressive weeds species. *Agratum conyzoides*, *Aster subalatus*, *Calendula tripterocarpa*, *Centure* sp, *Cirsium arvense*, *Coryza dioscoridis*, *Coreopsis drummondii*, *Echinops spinosissimus*, *Eclipla alba*, *Eclipta prostrate*, *Emilia sonchifolia*, *Flavaria trnervia*, *lactuca sativa*, *launaca capitate*, *Pennsylvania state*, *Prickiy lettace*, *Pulicaria crispa*, *Saussurea japonica*, *Senecio scundens*, *Sonchus asper*, *Sonchus oleraceus* and *Verbesina encelioides*. Similarly, sixteen agricultural crops were documented from the study area; *Allium cepa*, *Brassica oleracea* var. *botrytis*, *Anethum graveolens*, *Raphanus sativus*, *Allium ampeloprasum* var, *Solanum melongena*, *Medicago sativa*, *Lactuca sativa*, *Punica granatum*, *Solanum lycopersicum*, *Vitis spp*, *Brassica oleracea* var. *capitate*, *Cucurbita pepo*, *Phoenix dactylifera*, *Rosa damascene* and *Mentha*. Results of the survey obtained from the study would be useful in creating management control and proposing research toward improved new weed control measures. Also has provided insight on purposeful weeds control in Taif Area. The study recommends further studies on order types of weeds in the area.

Keywords: Weeds; Asteraceae; Taif Area; Saudi Arabia

INTRODUCTION

Weeds species are consider as one of the major constraints to cultivation of crop; resulted in yield loss based according to the composition and density of the species in the field. Studies on weeds species composition, distribution and biological life cycle it provides the needed information for employing management strategies. Also, it gives the idea or insight of changes occurring overtime in weeds composition in a particular environment (Majrashi). Competitions

exist between the cultivated crops and weeds species for the limited resources available in the field or provided for the sake of the cultivated crops (Majrshi & Khandaker, 2016). The competition results in the affecting of the quality and quantity of the yield. Disease arose to the cultivated crops from the infestation of the weeds. Weeds infestation also result in the attraction of insect to the cultivated lands. Reported by Majrshi & Khandaker, (2016) weeds are responsible for the loss of more than 50% of annual agricultural

products all over the world. Averagely, it has been estimated 10% of loss in agricultural product are documented annually in less developed countries and more than 20% in developed countries. Thus, knowledge of the weed species community composition is an important component of weed strategic management, essential in setting priorities for weeds species management and research purposes. Weeds compete for natural resources with crops, such as nutrients light and water (Thorp & Lynch, 2000). Promotion of diseases problems are also associated to weeds, slow down harvesting, weed serve as alternative hosts to insects and many harmful diseases, leads to increase in production cost, devalue the crop value in the market and also increase the chances of fire outbreak before harvesting. Weed also reproduce similar to order species of plants (Liebman & Dyck, 1993). Thus, the weeds quantity and quality in the soil are the sole responsible for the determination of the situation within the arable land. The term weeds are interchanging as a plant grown in a place not required for utilisation (Radosevich, Holt, & Ghersa, 2007). Reported by Armengot et al. (2011) in the process of describing weeds from attock district of Hazara that some weeds positive impacts but nevertheless they also possess negative consequences to the environment. Like damage of the agricultural crops, plants of medicinal value and pest. There by, living farmers with no option rather to take measures in order to overcome them. Weeds are plants species that are difficult to control as a result of their rapid growth and production (Fuente et al., 2010). Germination of weeds is always earlier than any cultivated crop, similarly to the growth, flowering and long lifespan (Grundy, 2003). Weeds are aggressive in terms acclimatization to the environment; which make them to be dominant in area if allowed for a certain period without control (Liebman, Staver, & Mohler, 2001). Weeds have negative effect on the abundance, diversity and pollination of permanent plants and cultivated crops. It has been reported the world total annual loss of food production due to the weeds is 11% annually. In crop production, weed control is paramount and important due to its effect on the quality and quantity of the yields at the end of the cultivation. All over the world weeds has been considered as the most threat to the conservation of economical plants. It is paramount to control and managed weeds in a reserved cultivated environment, unreserved to avoid overpowering of the economical plants. Therefore, there is need

for specialized personnel to be enlengthening the farmers and the populace on how to manage weeds around their farms and community. Measures has to put in place, such as cultural, mechanical, integrated cultivation, chemical, biological control and or combination of both methods in order to economically and effectively control the weeds. In order to effectively control weeds, there is also needs for the flowing study in a period of interval of time, there is need phenology study, periods of flowering and fruiting, methods of dispersal. The geographical location of Middle East is a region with a complex diverse display of topography with high peak mountains above 5000m with 400 m depression below the sea level, plateaus with elevation, foothills mountain and plains alluvial. The region contrast climate vary greatly from mild continental Mediterranean type to extremely type subtropical weather. desert rainless to high plateaus extremely cold. The vegetation composed of humid dense forest , moist and dry steppes, park forest and semi deserts. Based on the phytogeographical and geological history of the Middle East, it has been reported as early as period of Pleistocene human being has strongly influence the vegetation and flora which results in domestication of the native animals and plants in the area. Quite number of on the vegetational type and ecological aspect of Saudi Arabia (Majrashi et al., 2018). Others studies covered some regional aspect of Saudi kingdom. The vegetational type of Makkah Jeddah and Madinah Badr road was described by (Dogara & Jumare, 2014). Elaborated investigation was carried out on Aseer mountains based on the change in relation to the mountain elevation and analysis on the diversity of the species Hijaz central mountain (Majrashi et al., 2018). Studies of the mountain in Taif area in relation to environment revealed that salinity and soil water table are responsible for the discontinuities in the vegetational area . The vegetation and floristic diversity of Raud in the central part of Saudi Arabia has been analysed by Majrshi & Khandaker, (2016).Comparative studies of Riyadh in the central region of Saudi Arabia was also conducted (Majrshi & Khandaker 2016). Nevertheless, not much studies have been carried out on the diversity, distribution and analysis of plants species in Saudi Arabia. Investigation on weeds based on different elevation levels will provide baseline information needed on determination the level of competition of weeds with economical crops. In Taif Area agricultural activities create source of income in

places like floricultural, Ornamental, horticultural crops cultivation and Ornamental. In Saudi Arabia agricultural activities are aspect with economical values. In Arabian Peninsular the Saudi Arabian flora is one with the riches diversity. The flora also has many endemic species from Africa, Asia and Mediterranean region. Gymnosperms and pteridophytes with total no of 2250 species represented the flora of Saudi Arabia in 142 families. 600 are endangered and rare while 242 are endemic species. The cultivated crops in the region are mostly documented to have stunted growth with poorly development of canopy at their early stage. Therefore, the environment exposes them susceptible to compete with other natural plants like weeds with negative effect to growth

and yields of the crops. The following study aimed conducting research on the survey of weeds on *Asteraceae* Family in area of Taif Saudi Arabia. To our knowledge no research has been previously carried on the area. Results of the study we hope will address the lingering issues of how to manage weeds toward agricultural importance in Saudi Arabia.

MATERIALS AND METHODS

The Study Area (Taif Area) Figure 1 on the Sarwat Mountains eastern slopes at the altitude of 1700 m above sea level of the Mountains with increases toward the head to the south and west up to the level of 2500 m, located around N 20-22° and E 40-42°.



Figure 1: *Asteraceae* flora in Taif Saudi Arabia kingdom

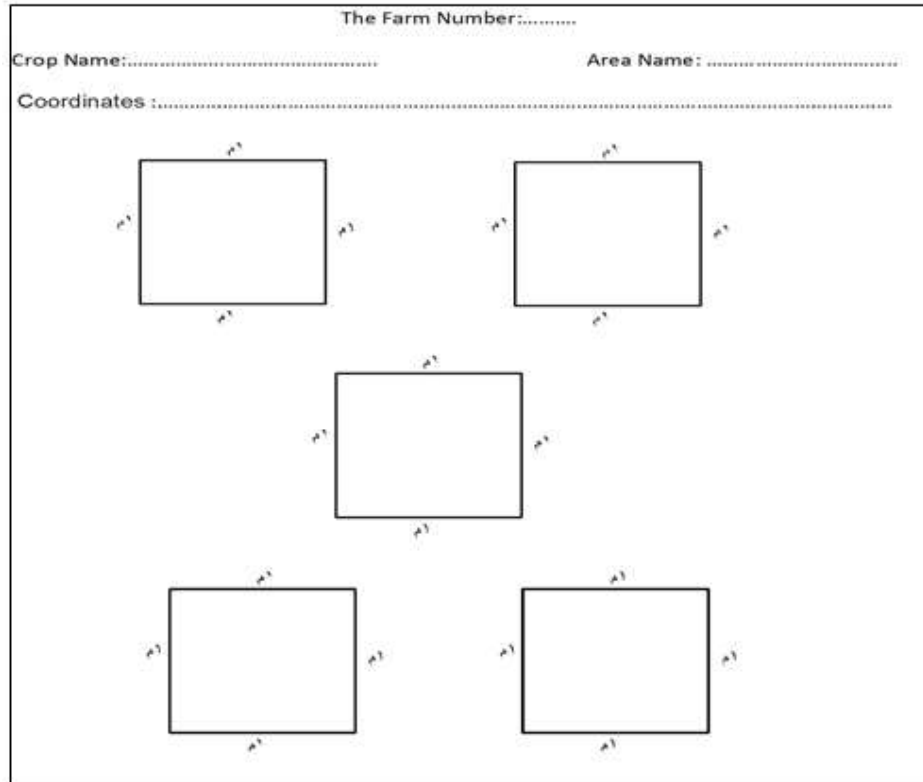


Figure 2: Experimental design and quadrats arrangement of weeds in Taif crops at Six Areas.

The vegetation of the Taif is famous in agricultural activities among the communities of Saudi Arabia Kingdom. With the total preserved area for agricultural activities of more than 594 000 hectares and approximately 594 000 farms. The study was carried at mountain at an elevation level of (Area A = Al sail 1700 m, Area B = Al Wahat and Al Watit 1500, C = Leeih 1500, D = AL Gaim and Saisad 1500, F = E = Al Shafa 2200 m, F = AL Hada = 2000 m) Figure 2.

The collected sample where identified and herbarium sample was prepared for further identification and deposition in herbarium. The weed was collected in an area where cultivation is taking place. The diversity and determination of the species were carried out based on the methods described by Majrshi & Khandaker, (2016).

DATA ANALYSIS

Analysis of the Data collected were converted to log+1 prior to statistical analysis and further subjected to one-way ANOVA. means were tested for significant difference, data with significant difference were further subjected to t-tests. The mean difference was significant at $p \leq 0.05$ level.

RESULTS

The study documents 21 species *Agratum conyzoides*, *Aster subalatus*, *Calendula tripterocarpa*, *Centure sp*, *Cirsium arvense*, *Conyza dioscoridis*, *Coreopsis drummondii*, *Echinops spinosissimus*, *Eclipla alba*, *Eclipta prostrate*, *Emilia sonchifolia*, *Flavaria trnervia*, *lactuca sativa*, *launaca capitata*, *Pennsylvania state*, *Prickiy lettuce*, *Pulicaria crispa*, *Saussurea japonica*, *Senecio scundens*, *Sonchus asper*, *Sonchus oleraceus* and *Verbesina encelioides* of *Asteraceae* family in six of the study areas in Taif Saudi Arabia Peninsular. *Pennsylvania state* (128) was found with highest number of species from study area (Table 1), followed by *launaca capitata* (121) (Table 1), *Sonchus asper* was found with the least number of species in all the documented species from the study area. Similarly, sixteen agricultural crops were documented from the study area; *Allium cepa*, *Brassica oleracea var. botrytis*, *Anethum graveolens*, *Raphanus sativus*, *Allium ampeloprasum var*, *Solanum melongena*, *Medicago sativa*, *Lactuca sativa*, *Punica granatum*, *Solanum lycopersicum*, *Vitis spp*, *Brassica oleracea var. capitata*, *Cucurbita pepo*, *Phoenix dactylifera*, *Rosa damascene* and *Mentha* as shown in (Table 2).

Table 1: Weeds species documented from Taif Saudi Arabia Peninsular

Species Name	Weed Number						Total
	Area1	Area2	Area3	Area4	Area5	Area6	
<i>Agratum conyzoides</i>						17	17
<i>Aster subalatus</i>				14			14
<i>Calendula tripterocarpa</i>			6				6
<i>Centure sp.</i>					69	13	82
<i>Cirsium arvense</i>				35			35
<i>Conyza dioscoridis</i>					31		31
<i>Coreopsis drummondii</i>				20			20
<i>Echinops spinosissimus</i>		35	72	1	186		
<i>Eclipta alba</i>	7	17					24
<i>Eclipta prostrate</i>					44	44	88
<i>Emilia sonchifolia</i>				66			66
<i>Flavaria trnervia</i>		4					4
<i>lactuca sativa</i>		6					6
<i>launaca capitata</i>		121					121
<i>Pennsylvania state</i>				128			128
<i>Prickiy lettace</i>				15			15
<i>Pulicaria crispa</i>					76		76
<i>Saussurea japonica</i>			24				24
<i>Senecio scundens</i>			4				4
<i>Sonchus asper</i>						3	3
<i>Sonchus oleraceus</i>	30	8	3	37	56	33	167
<i>Verbesina encelioides</i>			3				3
Total							1228

Table 2: Agricultural crops documented from Taif Saudi Arabia Peninsular

Agricultural crops		Weeds number						Total
Species name	English name	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	
<i>Allium cepa</i>	Onion	3	12		31	87	25	158
<i>Brassica oleracea var. botrytis</i>	Cauliflower	15		128				143
<i>Anethum graveolens</i>	Dill			60		43		103
<i>Raphanus sativus</i>	Radish				37			37
<i>Allium ampeloprasum var.</i>	Leeks		26					26
<i>Solanum melongena</i>	Eggplants	17						17
<i>Medicago sativa</i>	Alfalfa		8		84			92
<i>Lactuca sativa</i>	Lettuce			14				14
<i>Punica granatum</i>	Pomegranate	1	37					38
<i>Solanum lycopersicum</i>	Tomato	6						6
<i>Vitis spp.</i>	grape			81				81
<i>Brassica oleracea var. capitata</i>	Cabbage					15		15
<i>Cucurbita pepo</i>	Courgette	1	13	67		56		137
<i>Phoenix dactylifera</i>	Date plam	30						30
<i>Rosa damascena</i>	Flower					154	79	233
<i>Mentha</i>	Mint				48	38	12	98
Total								1228

DISCUSSION

The goals of a weed scientist are understanding distribution, nature and abundance of weed species within an agroecosystem is an important aspect of the study (Majrashi et al., 2018). Geographical distribution of the weeds species is termed as abundance, understanding the biological life cycle of the weed species is termed as nature and measuring the frequency of the individual weeds species is termed as abundance. Concept of studying the distribution and abundance of weed species in a particular landscape aids in determining how the population affect or change the compositions overtime (Abdulrahman, Ali, Fatimah, Khandaker, & Mat, 2018b). Knowledge of abundance, density and distribution of weed in a landscape is paramount or prerequisite for its effective management (Abdulrahman, Ali, Fatimah, Khandaker, & Mat, 2018a). It also helps in knowing how the pressure is affecting agricultural activities in the area. Diversity and abundance of weeds vary greatly with the location of the environment and agricultural activities. Both for biodiversity and agricultural practices needs exact estimation of the weeds population in an area Marshall et al., 2003. Biodiversity deals with the abundance, relationship of the species with other living species in the environment; human, animals and other plants species (Awang, Ali, Abdulrahman, & Mat, 2018). While in the case of agriculture deals with the application of herbicidal to the management of the weeds Armengot et al., 2011. One of the major threats of the world agriculture are weed; it tremendously reduced the quality and yield of agricultural products. Similarly, they also served as interacting components of the ecosystem. Weeds posed a serious challenge all over the world in respect to the agricultural products Mahmoud et al., 2019. Weeds if left unmanaged results to the yield loss of more than 70% of the planted crop. Studies has to be established, principles of integrated management of weeds. Group of populations interacting together in a particular place is known as a community (Boutin, Jobin, & Bélanger, 2003). The relationship or correlation existed among the community and diversity stability, bring the needs to conserve the biological richness within the environments. Weeds compete for natural resources with crops, such as nutrients light and water Tuck et al., 2014. Promotion of diseases problems are also associated to weeds, slow down harvesting, weed serve as alternative hosts to insects and many harmful diseases, leads to

increase in production cost, devaluate the crop value in the market and also increase the chances of fire outbreak before harvesting. Weed also reproduce similar to order species of plants. Thus, the weeds quantity and quality in the soil are the sole responsible for the determination of the situation within the arable land. The term weeds are interchanging as a plant grown in a place not required for utilisation Tuck et al. 2014. Reported by Armengot et al. (2011) in the process of describing weeds from attock district of Hazara that some weeds positive impacts but nevertheless they also possess negative consequences to the environment. Like damage of the agricultural crops, plants of medicinal value and pest. Thereby, living farmers with no option rather to take measures in order to overcome them. Weeds are plants species that are difficult to control as a result of their rapid growth and production (Jackson, Pascual, & Hodgkin, 2007). Germination of weeds is always earlier than any cultivated crop, similarly to the growth, flowering and long lifespan (Wu, 2013). The major constraints in agricultural production are weeds, and still consider as primary producers within the agricultural biodiversity Marshall et al., 2003. Weeds were known to have ecological role in biodiversity. Studying weeds competitiveness and their mode of growth will aid in identification and proposing a management control which will aid in vegetational control Marshall et al., 2003. Recently there is prioritization on sustainability of agricultural environment or landscape achieved by reliance on the ecological management and services Jackson et al., 2007. Looking at the said context, management of biodiversity is paramount in a view as an important strategy for coping against the risk of agricultural future uncertainty Tuck et al. 2014. The biodata found in an ecosystem, weeds contribute significantly either positively or negatively in supporting the diversity in the ecosystem Marshall et al., 2003. Taif vegetation analysis was conducted to know the diversity of weeds species in the landscape. As it has been previously reported to determine or propose a better management of weeds strategy largely depends on the available knowledge of the diversity and distribution of the weeds in the vegetational area Fried et al.2004; Marshall et al., 2003. Fried et al. (2008) also reported that cultivated crop status has to be access in order to ascertain or determine the composition and dominance of weeds species in an experimental area. Knowing the status of weeds species in agricultural environment will greatly help in

strategy management in overtaking the cultivated crop in the area (Albrecht, 2003).

CONCLUSION

The study has documented 21 weeds species composition in relation to different altitudes in Taif Saudi Arabia Peninsular Malaysia in association with agricultural crops found in the area. The study has identified some aggressive weeds in the area. The information provided the information needed in the management of weeds in the Taif area in other to avoid the effect of allelochemicals of the agricultural crop in the area. The following weeds can also be utilised in the production of herbicides. Further studies should be carried out on the chemical contents of the plants.

CONFLICT OF INTEREST

The authors declared that present study was performed in absence of any conflict of interest.

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AUTHOR CONTRIBUTIONS

The author contributed to all parts of the research.

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