

Impacts of the Pesticides Used In the Agriculture Setor, On Pollinators in Ziarat Juniper Biosphere Reserve Balochistan Pakistan

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Abstract: Diversity and population of pollinator play an important role in the production of field crops ,vegetables fruits and wild flora .insects pollinators bees ,howerfly and butterfly . were sampled form nine location belonging to following three habitats in ziarat juniper Biosphere Reserve the horticultureral ecosystem .apple orchards heavily sparyed ith pesticides five time spary in season a miture of horticulture an natural ecosystem the orchards with mild indensity of pesticides spary 1.2 pesticides spray early in the seasons including in a natural habitat nearby3 natural ecosystem without pesticides application with the determine the insect pollinator and their population. Biodiversity indicates dominance index and effected one or two insecticides application early in he seasons however a clear deeline was observed in the orchards where five pesticides psary were applied.

INTRODUCTION

The insects pollinator species provide akey ecosystem service as the contribute to agriculture production and biological diversity through crop and wildeflower reproduction . pollinators act as biological indicators organism that their presences . abundance and activities reveal the state of ecosystem in which the are found kevan1999 . however there is substantial evidence that population of pollinator is declining world wide as a result floral biodiversity and human livehood will suffer. The most important reasons for their decrease are fragmentation and loss of habitat increasednumber of esticides pplication enviornmental pollution decreased resource diversity alien species limate change and psread of their pathogen pottsel2010.moreover the area under cultivation especially apple and cherry orchrds in balochistan has increased which leading to more amount of pesticide being applied these orchards . the indiscriminate use of pesticides in fruit orchards vegetables and field cros has lead to many problem including environmental hazards reducedpopulation of pollinator elimination of natural preadator and parasitoids increased resistance in pests against pesticides residue change of status form minor pests to major and hence increase freuence of pesticides application jasra el al 2001, resent study was carried out to assesses the population of insect pollinators ziarat juniper biosphere reserve.

MATERIALS AND METHODS

This study was carried out during 12 to 19 August 2022 insect pollinators were sampled to access their population form nine localities belonging to following habitats in ziarat juniper Biosphere reserve;

1 The horticultural ecosystem ; apple orchards heavily sparyed with pesticides five spary in season 2, misture of horticulture and natural ecosystem the orchards with mild intensity of pesticide sparys 12 pesticide sparys early in the season including a natural habitat nearby 3 natural ecosystem without pesticide application the selected localities for data collection are given table. Insect pollinator syrphid flies bees and wasp and butterfly were collected for half and hour following a line transacts method of meters long and 2 meters wide tracts in the orchards and natural vegetation. The flowers in transacts were also searched for pollinators using net sweeping. The insect collection process was repeated for three times in each locality, on different tracts. The collected insects were killed in a collecting bottle using methyl acetate. The specimen were pinned, stretched, preserved, identified to genus level and deposited in the Insect Repository, Pakistan museum of natural history Islamabad, Pakistan hymenoptra species were identified using das and Gupta 1998, Mehmood elal 2012 and goulet and Huber 1993, butterflies were identified with help of Robert 2001 and syrphid flies were identified using ghropade 1984 the details of specimens collected from each locality given in table 2. The species diversity indices were calculate using a open access software passed biodiversity hammer el al 2001 the results of biodiversity indices are given in table 3.

RESULTS

Maximum no of genera 16 and total no of specimens 33 were recorded from quamer dam where natural juniper and Russian sage were common plants and pesticides were not applied in table 3. Similarly the next locality with highest no of genera 15 and total no of specimens 28 was melikate bagh a small cherry orchards surrounded by juniper forests wher no pesticide was applied and 13 genera and maximum no of specimens 33 were recorded from akram sakobi Apple orchards mixed with sun flower patato cucurbits and Russian sage and pesticide was separate once earlyn in the season. The highest no of specimens recorded may be due to diverse cropping pattern the low diversity at this site may be due to pesticide application . the lowest no of genera 7 and specimens 12 & 20 are recorded from raigora and manna respectively apple orchards mix with cucurbits and sage weed where five pesticide sprays where applied similarly 8 genera 15 specimens are observed at shotair where five pesticides sprays were applied 9 genera and 13 specimens were recorded from patch adda where five pesticides sprays were applied. The high level of dominance index at rajior 0.1944shotair 0.1644 patch adda 0.1642 and manna 0.19 places where with more pesticides pressure) shows that the occurrence of few species are more common which might be fast flyer or can show resistance to pesticide and all the specimens are not humanly distributed it is clear from data that Shannon by diversity index (SBI) was high at makiket badh 2.431 quamar dam 2.415 and akran sakobi 2.338 these are the places where either pesticide was not applied at all or single application was made early in the season. This means that these areas were more diverse in insect pollinators while the site where pesticide was applied five times the SBI was lowerb like regora 1.792 manna 1.775 and shotair 1.934 this shows that pesticides application in agro system was affected the pollinators the biodiversity adversely.

Table No 2 localities for data collection sho

Locality	latitue	Localities for Data Collection			Pesticide application
		longitue	Elevation9m	Common vegetation	
S1 Akram Sakobi	3022.965N	6746.623E	2774	Apple orchars with Sunfloer cucurbits	Russian sage One spary early in the season
S2 Raigora sanjawi	3017.861N	6814.964E	1743	Apple orchars with Sunfloer	Russian sage Fives psary

S3 Chotair	3017.185N	6757106E	2274	Apple orchars with cucurbit	Russian sage	Fives psary
S4 Quamar Dam	3021.554N	6754.520E	2428	Juniper forest	Russian sage	Without pesticides
S5 Pache Adda	3026.129N	6739.522E	2246	Appleorchard	Russian sage	Five pesticides
S6 Melikat Bagh pulwala	3020.973N	6747.252E	2956	Apple with cherry Orchard	Russian sage	No pesticides
S7 Melikat shaidan	3021.221N	6749.330E	2526	Apple orchars with cucurbit	Russian sage	No pesticies
S8 Manna	3028.057N	6743.44E	2429	Apple orchard	Russian sage	Two pesticides

Table No. 2 Detail of insects genera collected form each site.

Insects family	Subfamily	Insect Collection each Site			S4
		S1	S2	S3	
Aphidae	Xylocopinae Apinae	3	0	0	3

<i>Megachilidae</i>	<i>Megachilinae</i>	0	0	2	3
<i>Vespidae</i>	<i>Vespiniae</i>	0	1	0	1
<i>Syrphidae</i>	<i>Eristalinae</i>	10	0	0	0
<i>Scoliidae</i>	<i>Scoliinae</i>	0	4	0	1
<i>Pieridae</i>	<i>Pierinae</i>	1	0	3	0
<i>Danaidae</i>	<i>Danainae</i>	3	2	0	1
<i>Nymphalidae</i>	<i>Tirumalini</i>	0	3	2	0
<i>Total number of specimens</i>		17	10	7	9

Table No. 3 Biodiversity indices each site :

Name	S1	S2	S3	S4
Taxa	13	7	8	17
Individuals	17	10	7	9
Dominance index	0.1282	0.1744	0.133	0.171
Shannon index	2.338	1.792	1.934	2.417

DISCUSSION

The farmers in Ziarat valley commonly used pesticides including pyridaben insecticides and acaricide, Emamectin insecticide chlorpyrifos insecticide propargit (acaricide) and profenofos

plus cyprine thrin insecticide with acaricidal activities. These pesticides were applied against codling moth at early stage in May and later at latter stage in July and August. Most of the pesticides belong to organophosphorous group of pesticide and highly persistent. These pesticides were recommended by the dealers or sellers instead of technical staff of agriculture or plant protection department. The farmers were following a calendar sprays schedule and pesticide application after every 15 days without proper pest scouting or estimating the pest or predators or parasitoid population. The farmers were not following any safety precautions and does not calliberation method at some places apple fruit was being packed on next day of pesticide application and create awareness regarding the hazards of pesticide and their judicious uses. The protection of native pollinators is very important at this stage and different could be planned. Integrated approach should be adopted to control the pest if pesticide has to be applied it should be recommended by plant protection staff after proper pest scouting. Alternative control measure should be searched like biological.

A study should be planned to replace the high input water pesticide and fertilizer orchards like apple with those having low input requirement like walnut or cherry orchards and gave almost the same income although this study was conducted at end of the season even then it produced important result.

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