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Insect pests of wheat crop at Tandojam

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Abstract
The present study was conducted to study the insect pest diversity on a wheat crop, the specimens were collected from wheat crop adjacent to the Administration Block Sindh Agriculture University Tandojam from 15th of January 2018 to 25th of March 2018. In present study total 13 insect pest species were discovered under four orders, Hemiptera, Linnaeus 1758 revealed 10 species, *Nilaparvata lugens* (Stål, 1854) and *Delphacodes kuscheli* Fennah, 1955 under family Delphacidae Leach, *Pentastiridius hodgarti* (Distant, 1911) under family Cixiidae Spinola, 1839. Collection of leafhoppers revealed the occurrence of 3 species *Balclutha incisa* (Matsumura, 1902) under family Cicadellidae, Latreille 1802, *Psammotettix emarginata*, *Empoasca punjabensis* Singh-Pruthi, 1940. One aphid species *Aphis gossypii* Glover, 1877 under family Aphididae Latreille, 1802. True bugs were found with 3 species *Scotinophara limosa* (Walker, 1867) family Pentatomidae Leach, 1815, two species under family Lygaeidae Schilling, 1829, *Graptostethus servus* (Fabricius, 1787) and *Oxycarenus hyalinipennis* (Costa, 1843). One moth *Helicoverpa armigera* (Hübner, 1808) under family Noctuidae, Latreille, 1809. One grasshopper species *Acrida exaltata* Walker, 1859 under family Acrididae MacLeay, 1821. One click beetle species was also discovered namely *Melanotus punctolineatus* Pelerin, 1829 under family Elateridae, Leach, 1815.

Keywords: Wheat crop, Leaf hoppers, plant hoppers, bugs, Tandojam, insect pests

Introduction
The wheat is an important grain crop which is being grown in Pakistan having scientific name *Triticum aestivum* also famous locally with names *Kanak* (Sindhi) and *Gandum* (Urdu) in the country. It is cultivated during winter cropping season after cultivation of summer crops rice and cotton. A report published by Pakistan Agriculture Research Council [1] that country consumes 120 kg of wheat per capita per year. All Provinces of Pakistan have been cultivating wheat, therefore country's name has been found in list of top 10 wheat producing states of the globe, but still there is problem to complete the grain requirement of increasing population of the country. The wheat crop has also many pests which damage the yield and quality of grains and are responsible for great reduction in yields. There are many species of insects which can cause damage to crop, including various kinds of diseases the weather conditions may also be responsible for yield losses in wheat. Various species of insects have been discovered feeding inside the stem or on the leaves of the plant. The changes in life called Biodiversity, but also presence of same kind of organisms in agroecosystem, generally called as biodiversity. When taking consideration of the biodiversitical effect, the things which are important to be considered are stability and productivity [2].

Among the insect biocenosis that damage winter wheat agroecosystem, leafhoppers have a very important place. Leafhoppers include about 20000 phytophagous species distributed worldwide. Most leafhoppers (*Psammotettix alienus*, *Javesella pellucida*, *Macrosteles laevis*) found on cereals and the first one is a vector for viruses [10, 12]. Naturally occurring carnivorous insects are responsible for the control of insect pests of wheat [15].

The crop has two critical periods of being attacked by insects first headling and other is flowering phases [3]. Aphid are known to be more dangerously damaging pests of wheat crop [4, 5]. Studies have been done to know the yields losses caused by *Rhopalosiphum padi* (L.), *Metopolophium dirhodum* (Wlk.) and *Sitobion avenae* (Fab.) [6, 7, 8]. Significant damages have been caused by thirps to wheat crops, the development of wheat nearly overlaps thirps life cycle [9].

Accurate identification of insect species can give a strong background to understand and to know the phylogenetic patterns, diversity and the process of evolution and extinction among and between various species. Proper identification of species permits for comparison or

expansion of more ancient research works. Due to above mentioned wide range of insect pest problems invading wheat crop and causing losses in production, it was felt necessary to observe the current insect pest status on wheat crop in Tandojam, the available knowledge will be helpful for the wheat growers to diagnose insect pests and find its solution to increase their crop yields.

Materials and methods

Place of work: For present studies adult specimens were collected from wheat crop adjacent to the Administration Block Sindh Agriculture University Tandojam from 15th of January 2018 to 25th of March 2018. Further examination and identification were carried out at Insect Systematic Laboratory, Department of Entomology, Sindh Agriculture University Tandojam.

Method of collection: Collection was made through sweep net, pitfall traps and pooter from selected wheat field.

Methods of killing and preserving: Specimens were killed in a jar containing potassium cyanide and mounted through entomological pins, further specimens were labeled.

Methods of identification: To identify the specimen up to the species level, specimens were run through the keys for the region were collected from various publications.

Results

In present study total 13 species were discovered under four orders of class insecta, Hemiptera, Linnaeus 1758 revealed 10 species 3 within Fulgoromorpha*; Nilaparvata lugens* (Stål, 1854) and *Delphacodes kuscheli* Fennah, 1955 under family Delphacidae Leach, subfamily Delphacinae Jensen and tribe Delphacini Lambertie, 1901; *Pentastiridius hodgarti* (Distant, 1911) under family Cixiidae Spinola, 1839 under subfamily Cixiinae Spinola, 1839 and tribe Pentastirini Emeljanov, 1971. Collection of leafhoppers revealed the occurrence of 3 species *Balclutha incisa* (Matsumura, 1902) under family Cicadellidae, Latreille 1802 subfamily Deltocephalinae, Fieber 1869 and tribe Macrostelini, Kirkaldy 1906; *Psammotettix emarginata* under tribe Paralimnini Distant, 1908. *Empoasca punjabensis* Singh-Pruthi, 1940 under subfamily Typhlocybinae, Kirschbaum, 1868, tribe Empoascini Distant, 1908. One aphid species *Aphis gossypii* Glover, 1877 under family Aphididae Latreille, 1802, subfamily Aphidinae Latreille, 1802 and tribe Aphidini Latreille, 1802. True bugs were found with 3 species *Scotinophara limosa* (Walker, 1867) family Pentatomidae Leach, 1815, subfamily Podopinae Amyot & Serville, 1843 and tribe Podopini Amyot & Serville, 1843; two species under family Lygaeidae Schilling, 1829 and subfamily including; Lygaeinae Schilling, 1829 *Graptostethus servus* (Fabricius, 1787) and *Oxycarenus hyalinipennis* (Costa, 1843). One moth *Helicoverpa armigera* (Hübner, 1808) under family Noctuidae, Latreille, 1809 and subfamily Heliothinae, Boisduval, 1828 One grasshopper's species *acrida exaltata* Walker, 1859 under family Acrididae MacLeay, 1821, subfamily Acridinae MacLeay, 1821 and tribe Acridini Serville, 1838. One click beetle species was also discovered namely *Melanotus punctolineatus* Pelerin, 1829 under family Elateridae, Leach, 1815, subfamily Elaterinae, Leach, 1815 and tribe Ampedini, Johnson, 2002.

Discussion

Insect biodiversity on wheat crop earlier was not considered as a harmful element, but due to the recent changes in climate and introduction of new varieties several insects are recorded on wheat crop in Tandojam, however, there was a big loss to wheat crop this year due to attack of armyworm in Sakrand, Benazir Abad, but it was not recorded in Tandojam. Some insects are common visitors of wheat crop including aphids, but they usually been under check by their natural enemies as they voraciously fed by coccinellids and Chrysoperla. In present study identification of insect pest species were considered only. The crop has two critical periods of being attacked by insects first headling and other is flowering phases. [3] Thrips have been recorded to cause damage [4, 5]. but no thrips have been recorded here so for.

Leafhoppers are known as bioindicators and include about 20000 species worldwide [10, 11]. In present study three species of leafhoppers were discovered including; *Balclutha incisa* (Matsumura, 1902), *Psammotettix emarginata* Singh, 1969 under tribe Paralimnini Distant, 1908 and *Empoasca punjabensis* Singh-Pruthi, 1940 under subfamily Typhlocybinae, Kirschbaum, 1868 and tribe Empoascini Distant, 1908. The majority of leafhoppers (*Psammotettix alienus*, *Javesella pellucida*, *Macrosteles laevis*) found on cereals and the first one is a vector for viruses [12, 13, 14]. Since *Psammotettix* is recorded here and can be the vector of diseases on wheat crop.

Three planthopper species are recorded they can be easily separated from leafhoppers, as leafhoppers possess row of setae on hind tibia, whereas, in planthoppers it is absent and possess Y shaped anal vein, these include; *Nilaparvata lugens* (Stål, 1854), *Delphacodes kuscheli* Fennah, 1955 and *Pentastiridius hodgarti* (Distant, 1911).

Bugs are sometimes very notorious as an agricultural pest, their mouthparts are piercing and sucking, thereby make them capable of feeding directly on a crop and as a vector of plant diseases, the records in present study include*; Scotinophara limosa* (Walker, 1867), *Graptostethus servus* (Fabricius, 1787) and *Oxycarenus hyalinipennis* (Costa, 1843). Larvae of click beetles are called as wireworms they are usually saprophagous, living on dead organisms, but some species are serious agricultural pests, and others are active predators of other insect larvae. One species of click beetle *Melanotus punctolineatus* Pelerin, 1829 is recorded here.

The family (Elateridae) click beetles attached to the deferent crops. Click beetles (wireworms) has economic importance as pest which can attack various parts of the plant such as seeds and roots of various crops throughout the globe. One species of click beetle has been recorded on wheat crop *Melanotus punctolineatus* Pelerin, 1829 under family Elateridae [16].

Total 4 families of grasshoppers were recorded at Khaiber Pukhtoonkhawa, the species recorded include; *Heteracris illustris*, *Sphingonotus rubescens*, *Schistocerca gregaria*, *Ochrilidia gracilis* and *Scintharista notabilis*. In present research grasshopper species *acrida exaltata* under family Acrididae has been found [17].

Map of Study Area

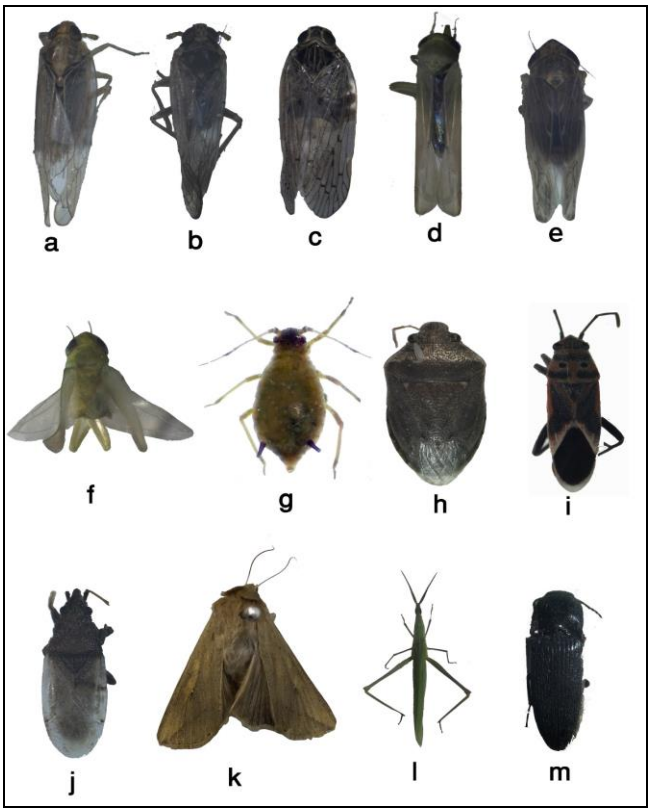

Plate 1: a-m; **a)** *Nilaparvata lugens;* **b)** *Delphacodes kuscheli;* **c)** *Pentastiridius hodgarti*; **d)** *Balclutha incisa*; **e)** *Psammotettix emarginata;* **f)** *Empoasca punjabensis;* **g)** *Aphis gossypii;* **h)** *Scotinophara limosa;* **i)** *Graptostethus servus;* **j)** *Oxycarenus hyalinipennis;* **k)** *Helicoverpa armigera; l) Acrida exaltata;* **m)** *Melanotus punctolineatus.*

Conclusion

In present study total thirteen insect pest species were discovered on wheat crop which includes; 10 species of oreder Hemiptera, *Nilaparvata lugens*, *Delphacodes kuscheli*, *Pentastiridius hodgarti*, *Balclutha incisa*, *Psammotettix emarginata*, *Empoasca punjabensis*, *Aphis gossypii*, *Scotinophara* limosa, *Graptostethus servus* and *Oxycarenus hyalinipennis*. One moth under order Lepidoptera *Helicoverpa armigera*. One grasshopper species *Acrida exaltata* under order Othoptera. One click beetle species was also discovered namely *Melanotus punctolineatus* under order Coleoptera.

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