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Prevalence of insect pests of sunflower at Golarchi Badin Sindh, Pakistan

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Abstract
The Hysun-39 variety was cultivated on an area of ½ acre in December 2014, at seed production unit of Guard Agriculture Research and Services Farm Golarchi, Badin. Plant to plant distance was maintained at 10 inches and row to row 35 inches. Data of the insect pest population was recorded after ten days, 30 plants were selected randomly from the experimental plot, 05 leaves and head from each plant was observed for insect pest population. The observation was taken till harvesting. The metrological record was kept during research work. The data thus collected was analyzed statistically through software SXW 8.0. The predatory behavior of ladybird beetles was positively correlated with aphid, whereas maximum population of ladybird 5.45 was recorded on 12nd February, it was observed that with the increase of aphid population the population of ladybird beetles did not increase, it remained constant till March and then declined. Zigzag beetle population was started in January and at highest reached 2.74 per plant. Attack of spotted bollworm incidence started in March its population remained constant till April. In first week of April the population of whitefly was at highest, later started declining gradually till last week. Overall results recorded mean population as for aphids (71.62), whitefly (13.43), jassid (7.93), spotted beetle (2.35), ladybird beetle (4.89) and zigzag beetle (2.74).

Keywords: Sunflower, Prevalence, Insect pests, Golarchi, Sindh, Pakistan.

1. Introduction
The genus *Helianthus* is indigenous to North America and the cultivated sunflower (*Helianthus annuus* L.) ranks with soybean, rapeseed and groundnut as one of the four most important annual crops in the world grown mainly for edible oil. It is grown on over 22 million hectares worldwide, with a production of 26 million tons [1]. Average grain yield in the world is around 1.1 t/ha, varying from 0.5 to 3.6 t/ha [2]. It was introduced in Pakistan during 1960 with the object of bridging the gap between production and consumption of edible oil in the country [3]. The edible oil requirement for the country was 404391 tons in 2010-11 as compared to 325978 tons in 2009-10 [4]. In Pakistan sunflower can be grown twice in a year during spring and winter. Sunflower grown in spring is usually slower in growth than during autumn [5].
Sunflower attacked by a number of insect pest species [6] [7] or natural enemies [8]. The pests classified in 3 regions (head, foliage and stem feeders). Among them, head feeders caused heavy losses directly or by feeding on seeds and produced fungal pathogens on sunflower leaves [9]. From Pakistan number of researcher reported insect pests [10] reported the sucking insect pests of sunflower viz. jassid, whitefly, aphids, grass hoppers and bud moth. [11] stated that whitefly is a major insect which damaged the sunflower in field condition. [12] provided elaborate list of pests, later [13] expanded the list reporting *Agrotis* spp., *Odontotermes obesusi*, *Agapanthia dahlii*, *Melanagromyza* spp. and *Myllocerus blandus*. Key features of sunflower variety, Hysun 39 includes medium maturity, excellent yield potential, stress and disease tolerance, semi-pendulous head, ability to produce consistently high yields [14]. Study area Golarchi is populated city of district Badin and an agriculture centre famous for sunflowers, paddies and sugarcane. Keeping in view the importance of sunflower as an oil seed crop present study was planned, it will be the first attempt to study sunflower variety Hysun-39 at Golarchi, the result will help to understand the insect pest fauna invading selected variety.

2. Material and Methods
The Hysun-39 variety was cultivated for the purpose of seed production on an area of ½ acre

on 19th December 2014, at seed production unit of Guard Agriculture Research and Services farm Golarchi. Plant to plant distance was maintained at 10 inches and row to row 35 inches. All agronomical practices were carried out accordingly, ½ bag of DAP was applied at the time of sowing, no further irrigation, fertilizer and pesticide was applied throughout the cropping season. Data of the insect pest population was recorded after ten days, 30 plants were selected randomly from the experimental plot, 05 leaves and head from each plant was observed for insect pests' population. The observation was taken till harvesting. The metrological record was kept during research work. The data thus collected was analyzed statistically through software SXW 8.0.

3. Results

The population of various insect pests and natural enemies was recorded on sunflower during January 2015 to April 2015.

The data (Fig.1) shows that aphid, jassid, ladybird, SBW, whitefly and zigzag beetle mean population was mean±SE 9.31±0.57, 1.00±0.06, 4.23±0.26, 0±0, 0±0 and 1.11±0.06, respectively on January 23, 2015.

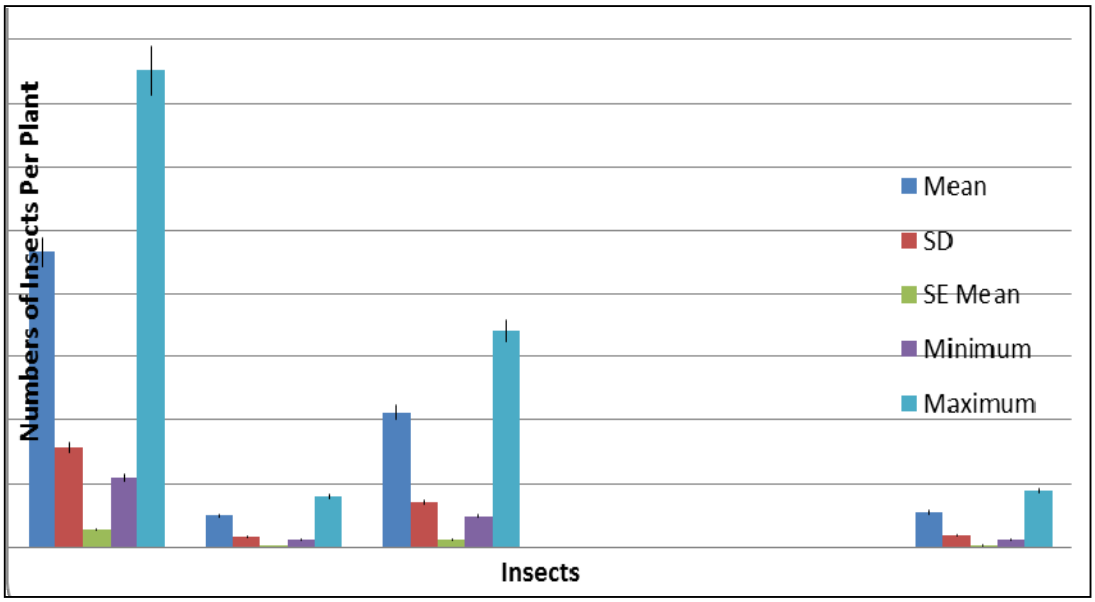

Fig 1: Insects population on randomly selected sunflower plants on January 23, 2015

The data (Fig.2) shows that aphid, jassid, ladybird, SBW, whitefly and zigzag population was mean±SE (25.74±1.58, 1.18±0.07, 3.89±0.23, 0±0, 0.31±0.01 and 2.50±0.15), respectively on February 02, 2015.

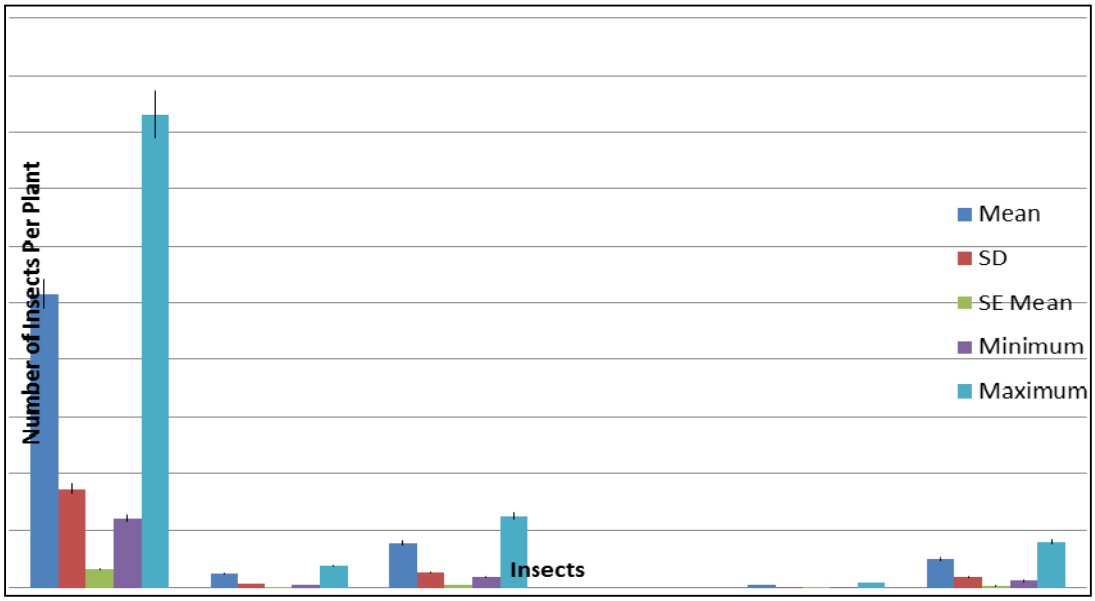

Fig 2: Insects population on randomly selected sunflower plants on February 02, 2015

The data (Fig.3) shows that aphid, jassid, ladybird, SBW, whitefly and zigzag population was mean±SE (26.83±1.65, 1.23±0.07, 4.97±0.30, 0.20±0.01, 3.13±0.19 and 1.70±0.10), respectively on February 12, 2015.

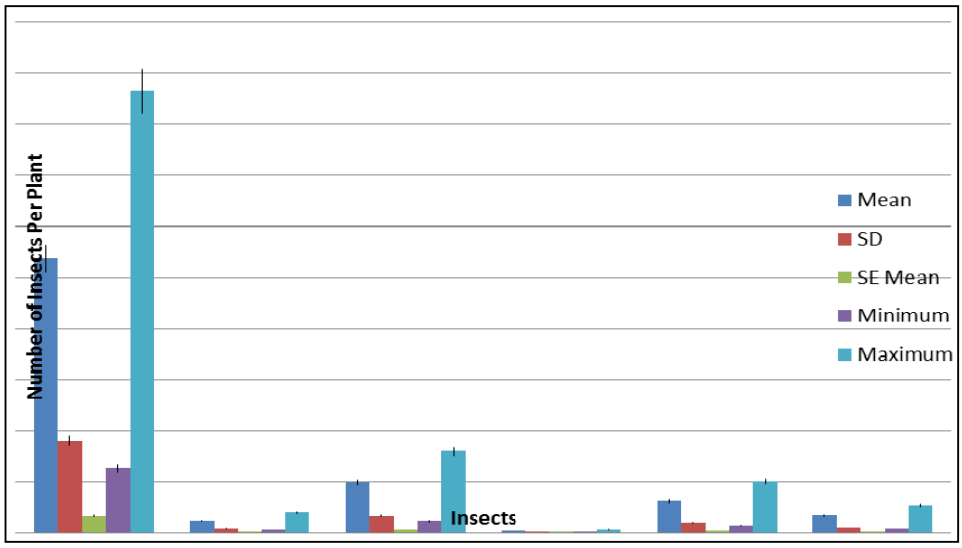

Fig 3: Insects population on randomly selected sunflower plants on February 12, 2015

The data (Fig.4) shows that aphid, jassid, ladybird, SBW, whitefly and zigzag population was mean±SE (31.08±1.91, 3.40±0.20, 4.46±0.27, 0.23±0.01, 6.32±0.38 and 0.26±0.01), respectively on February 22, 2015.

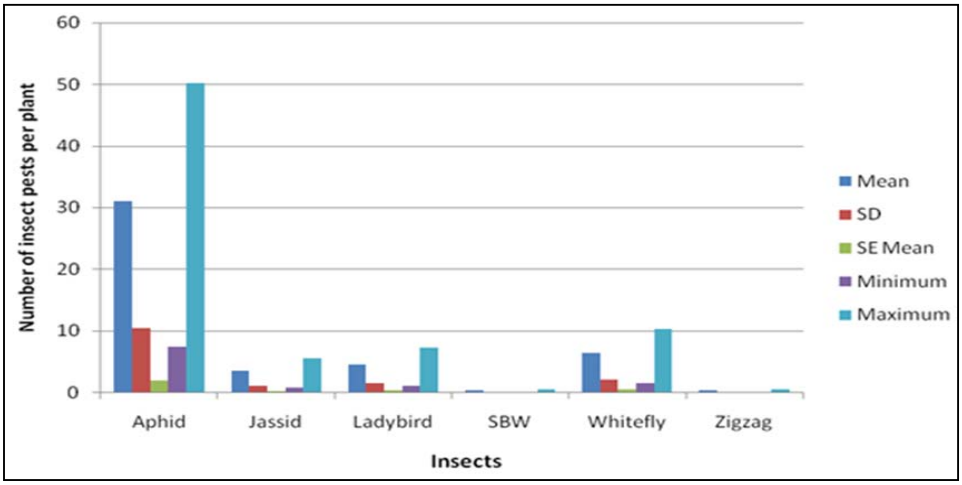

Fig 4: Insects population on randomly selected sunflower plants on February 22, 2015

The data (Fig.5) shows that aphid, jassid, ladybird, SBW, whitefly and zigzag population was mean±SE (65.37±4.02, 5.06±0.31, 0.47±0.02, 2.45±0.15, 6.68±0.41 and 0.36±0.02), respectively on March 04, 2015.

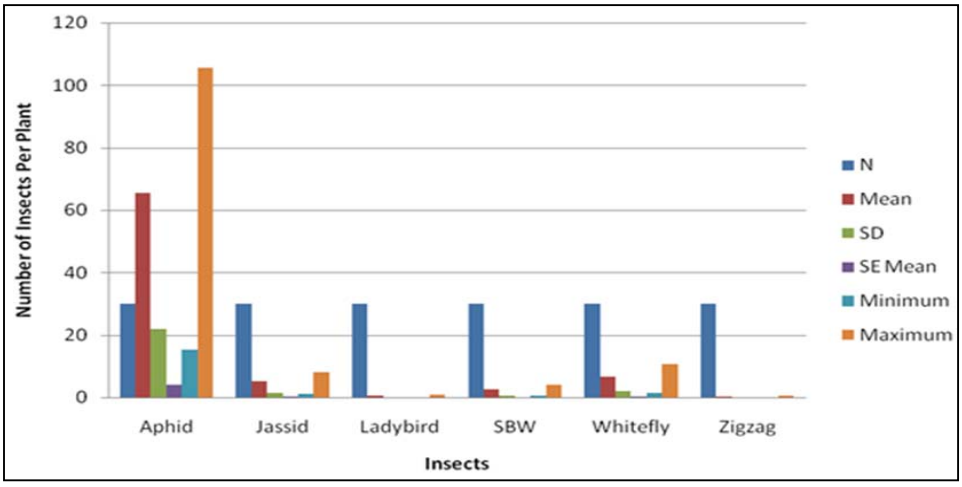

Figure 5: Insects population on randomly selected sunflower plants on March 04, 2015

The data (Fig.6) shows that aphid, jassid, ladybird, SBW, whitefly and zigzag population was mean±SE (10.44±0.64, 7.23±0.44, 0.22±0.01, 1.05±0.06, 12.25±0.75 and 1.03±0.06), respectively on March 14, 2015.

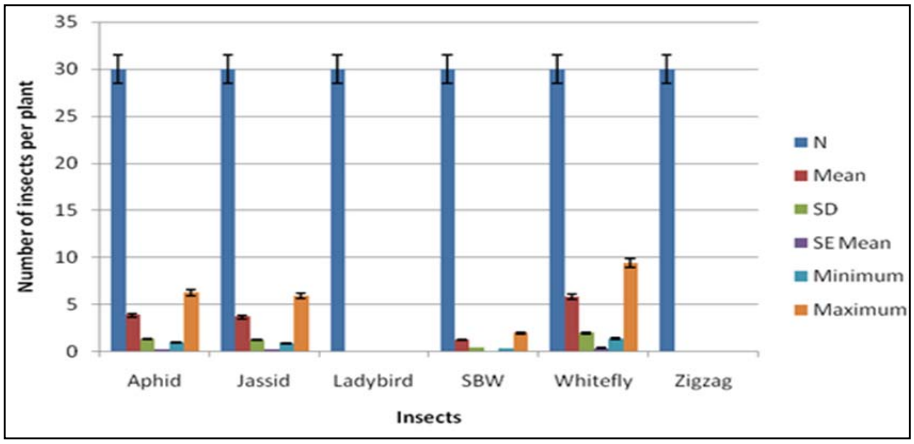

Fig 6: Insects population on randomly selected sunflower plants on March 14, 2015

The data (Fig.7) shows that aphid, jassid, ladybird, SBW, whitefly and zigzag population was mean±SE (3.85±0.23, 3.66±0.22, 0±0, 1.21±0.07, 5.80±0.35 and 0±0), respectively on March 24, 2015.

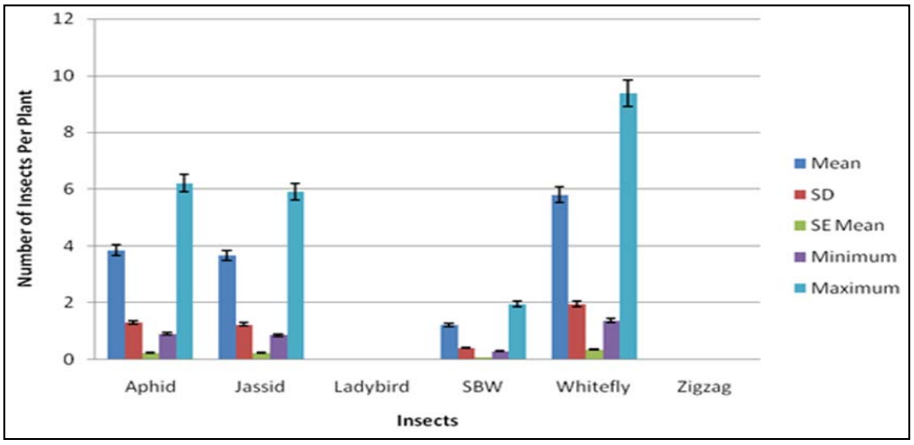

Fig 7: Insects population on randomly selected sunflower plants on March 24, 2015

The data (Fig.8) shows that aphid, jassid, ladybird, SBW, whitefly and zigzag population was mean±SE (2.34±0.14, 1.85±0.11, 0±0, 1.84±0.11, 1.92±0.11 and 0±0), respectively on April 03, 2015.

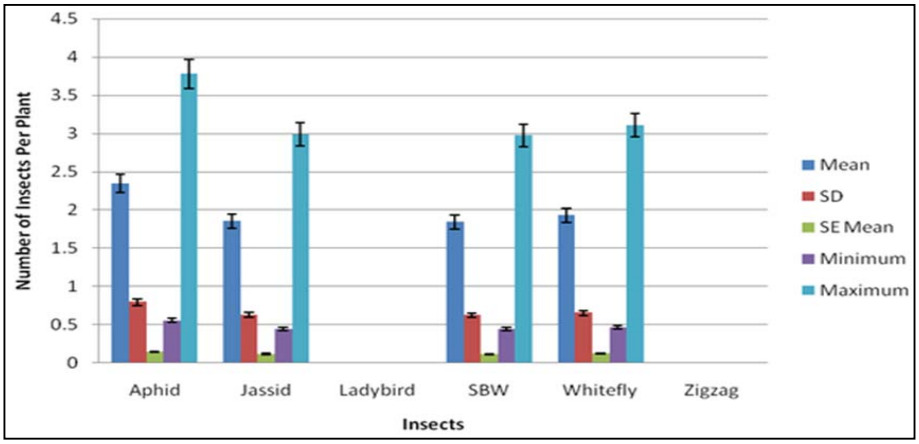

Fig 8: Insects population on randomly selected sunflower plants on April 03, 2015

The data (Fig.9) shows that aphid, jassid, ladybird, SBW, whitefly and zigzag population was mean±SE (1.49±0.09, 1.33±0.08, 0.30±0.01, 2.14±0.13, 1.16±0.07 and 0.24±0.01), respectively on April 13, 2015.

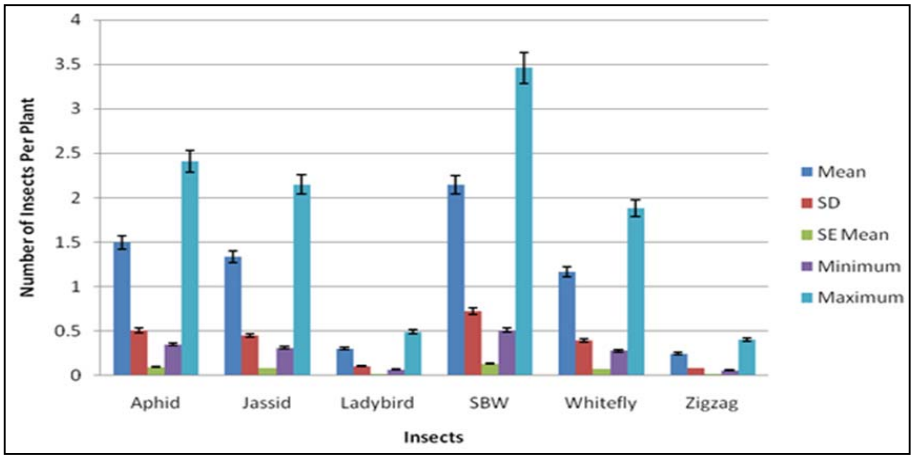

Fig 9: Insects population on randomly selected sunflower plants on April 13, 2015

The data (Fig.10) shows that aphid, jassid, ladybird, SBW, whitefly and zigzag population was mean±SE (1.12±0.06, 1.08±0.06, 0±0, 0.55±0.03, 1.05±0.06 and 0±0), respectively on April 23, 2015.

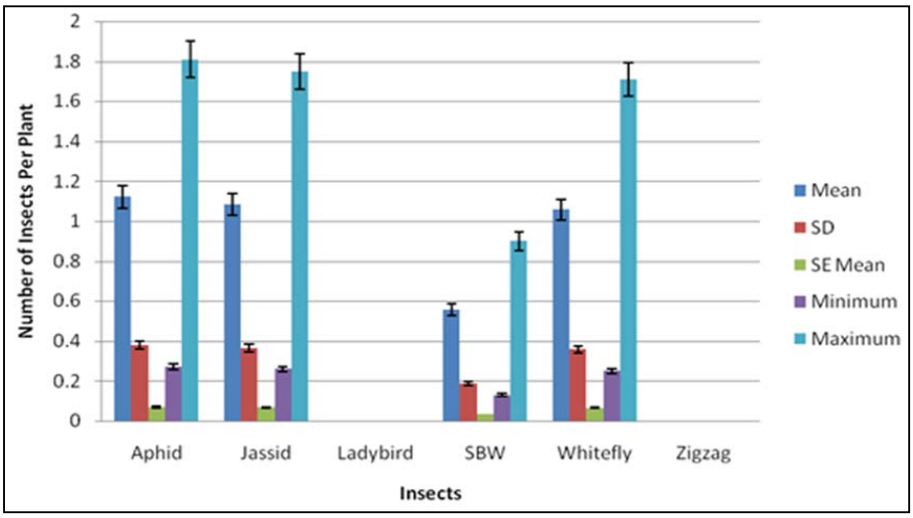

Fig 10: Insects population on randomly selected sunflower plants on April 23, 2015

Overall results (Fig.11) showed that mean population was recorded for aphids (71.62) during 04th March, whitefly (13.43) 14th March, jassid (7.93) 14th March, spotted (2.69) 04th March, ladybird beetle (4.89) 22nd February and zigzag beetle (2.74) 02nd February, respectively.

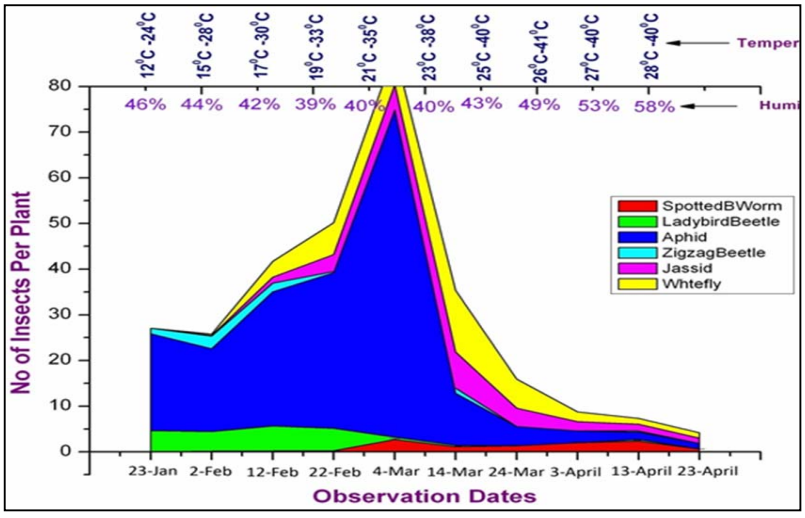

Fig 11: Overall means of insect population on sunflower with relative Temperature and humidity at Golarchi Badin

4. Discussion

Sunflower is the major source of edible oil, since the introduction of sunflower in Pakistan during 1960 it was invaded by various harmful as well as beneficial insects; spotted bollworm, jassid, whitefly, aphid, ladybird beetle and zigzag beetle. The findings of present study shows that maximum mean population was recorded for aphids (71.62) during 04th March, whitefly (13.43) 14th March, jassid (7.93) 14th March, spotted (2.69) 04th March, ladybird beetle (4.89) 22nd February and zigzag beetle (2.74) 02nd February, respectively. These results are supported by [6] [7] sunflower attacked by a number of insect pest species or natural enemies [8]. The pests classified in 3 regions (head, foliage and stem feeders). Among them, head feeders caused heavy losses directly or by feeding on seeds and produced fungal pathogens on sunflower leaves [9]. From Pakistan number of researcher reported insect pests so for [10] reported the sucking insect pests of sunflower viz., jassid, whitefly, aphids, grass hoppers and bud moth. [11] Stated that whitefly is major insect which damaged the sunflower in field condition. The data revealed that aphid population gradually increased from January 23, and reached at peak till March 04, the populations of ladybird beetle and zigzag beetle was higher than zigzag beetle, but it was enough to check the population of aphid. Pest population showed sudden change when temperature rises from 35 ^{0}C, it decreased aphid population and ultimately due to the unavailability of food for natural enemies the population of ladybird beetle and zigzag beetle was also decreased.

5. Conclusion

It was concluded that sunflower variety (Hysun) attacked by a number of sucking insects pests (aphid, jassid, whitefly, spotted bollworm, ladybird beetle). Among them maximum population were noticed for Aphid followed by whitefly, jassid, spotted bollworm, ladybird beetle and zigzag beetle, respectively.

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