

### Short Communication

## Effect of weather parameters on population dynamics of aphid, *Aphis odinae* (van der Goot) (Hemiptera: Aphididae) on cashew in Goa

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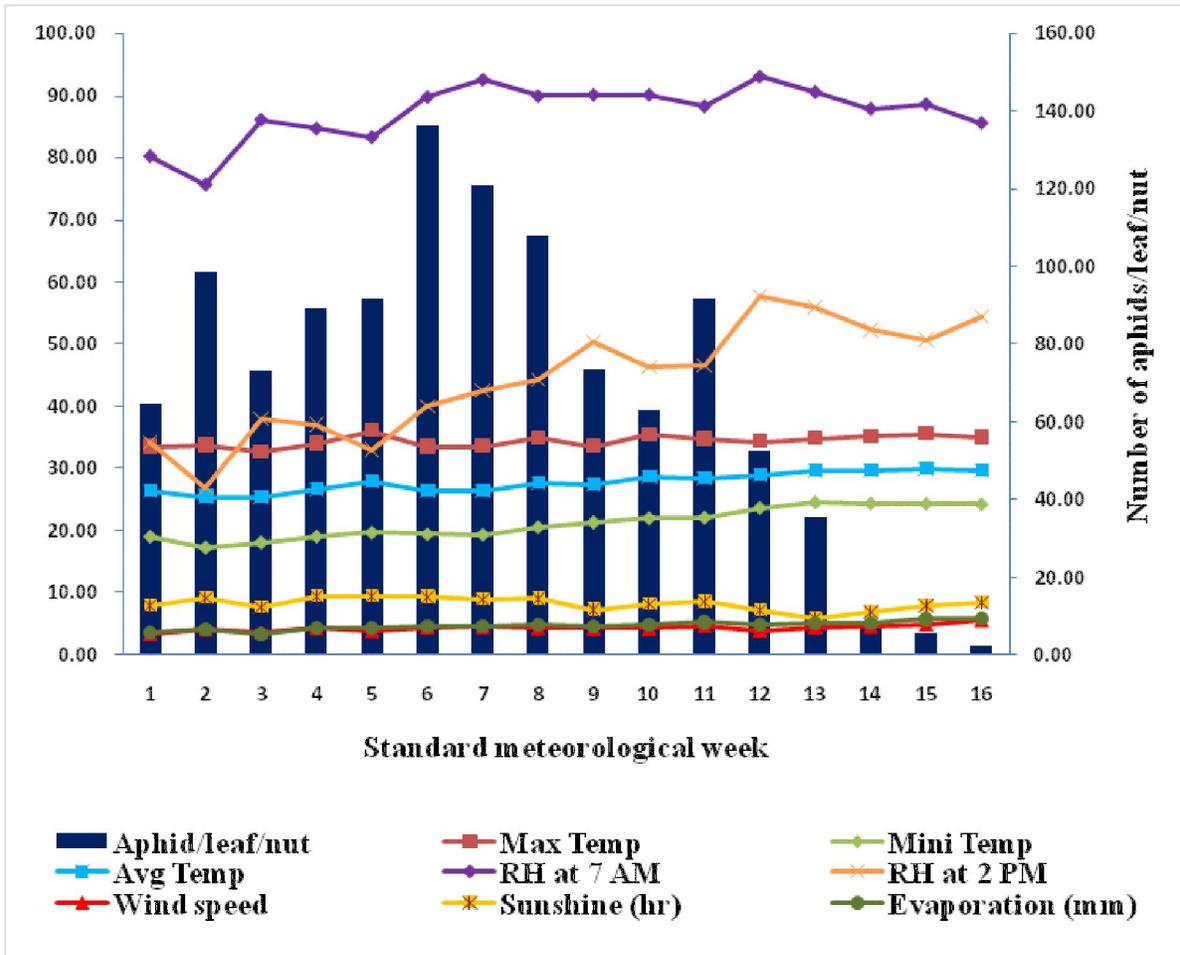
Cashew (*Anacardium occidentale* L., Family: Anacardiaceae) is one of the economically important plantation crops in India. The crop is widely grown in tropical climates and it is very well adapted to the Indian conditions. Insect pest infestation is the major constraint in cashew production. The crop is known to host more than 50 species of insects pests in India (Maruthadurai *et al.*, 2014; Maruthadurai and Singh, 2015). Apart from its regular pest, recently sporadic occurrence of aphid, *Aphis odinae* (*Toxoptera odinae*) (Van der Goot) (Hemiptera: Aphididae) was found on leaves and nuts of cashew. It is a polyphagous and sucking insect pest feeds on trees and shrubs of many plants. Nymphs and adults aggregate in large numbers on tender leaves, shoots, inflorescences, apples and nuts and suck the cell sap. They excrete honeydew on which sooty mould develops, impairing photosynthetic activity of the crop plants. Heavy infestation leads to shedding and drying of inflorescences or distorted and malformed nuts and apples. The damage was heavier on young plantations. (Maruthadurai and Singh, 2017). Pest population and their status are largely influenced by different weather parameters *viz.*, temperature, relative humidity, rainfall, wind speed, evaporation and sun shine hours *etc.* Therefore, a thorough understanding of interaction between weather parameters and pest dynamics is essential for standardising management practices. Hence, the present investigation was undertaken to study the effect of different weather parameters on population dynamics of aphid *A. odinae* in cashew ecosystem.

The present study was carried out at experimental farm of ICAR-Central Coastal Agricultural Research Institute, Ela, Old Goa, Goa, India (15°29'N & 73°55'E) during the year 2015 and 2016. The plantation was seven years old and has different released varieties and hybrids of cashew. No plant protection measure was undertaken throughout the observation period and followed all the recommended agricultural practices for maintaining the healthy crop. Aphid infested plants were marked and weekly observations were

made on leaves, shoots, and apple and nuts on all four sides (quadrants) of marked trees. The aphid populations were counted on 20 randomly selected aphid infested plants. Observations on the incidence aphids were recorded starting from initial appearance to up to nil populations. The data on weather parameters during the observation periods were collected from meteorological observatory located in the institute. The weather parameters included are daily maximum temperature, minimum temperature, average temperature (°C), relative humidity at 7.00 am and 2.00 pm (RH<sub>day</sub>), bright sun shine hour, evaporation (mm), and wind velocity (kmph). Correlations were analysed statistically by using SAS software version 9.3 in order to find out the effect of different weather parameters on the incidence of aphid on cashew.

The pooled mean population of aphid *A. odinae* / leaf / nut are summarised in Fig 1. Initially, the aphid population or damage was observed on young leaves and later migrated to apples and nuts. The incidence of aphid on cashew was started during first standard meteorological week (SMW) during the year 2015 with 90.22 nymphs and adults/ leaf. The population of aphids were gradually increased and reached maximum population during 7<sup>th</sup> SMW (*i.e.*, 2<sup>nd</sup> week of February) with 203.07 nymphs and adults/ leaf/ nut. The aphid population started declining from 2<sup>nd</sup> week of March onwards. Minimum population of 2.4 nymphs and adults/ leaf/ nut was recorded during 14<sup>th</sup> SMW. There was no aphid population from last week of April onwards. Almost similar trend of aphid population was recorded during the year 2016 but the intensity varied within a week. Maximum population of 132.6 nymphs and adults/ leaf/ nut was recorded during 11<sup>th</sup> SMW (*i.e.*, 2<sup>nd</sup> week of March). The aphid population started declining from last week of March and recorded lowest 1.2 nymphs and adults/ leaf/ nut during 3<sup>rd</sup> week of April.

Correlation coefficient between *A. odinae* population and weather parameters revealed that aphid population had significant negative correlation with minimum temperature



**Fig 1:** Mean population of aphid *Aphis odinae* infesting cashew and influenced by mean weather parameters of the year 2015 and 2016.

**Table 1:** Correlation between cashew aphid *A. odinae* and weather parameters (pooled data of 2015 and 2016)

| Weather parameters                 | Correlation coefficient |
|------------------------------------|-------------------------|
| Maximum temperature ( $T_{max}$ )  | -0.442 ns               |
| Minimum temperature ( $T_{min}$ )  | -0.778**                |
| Average temperature ( $T_{mean}$ ) | -0.748**                |
| Relative humidity at 7 am (RH I)   | -0.040 ns               |
| Relative humidity at 2 pm (RH II)  | -0.618*                 |
| Sunshine hour (BSS)                | 0.662**                 |
| Evaporation (EP)                   | -0.523*                 |
| Wind speed                         | -0.390 ns               |

\*Significant at 5%, \*\* Significant at 1% level. ns- non-significant

(0.778), average temperature (0.748), evening relative humidity (0.618) and evaporation (0.523) indicating that increasing these factors adversely effect on aphids

population. It seems that average minimum temperature (18.7) and average evening RH (34.88) favoured the initial build up of aphid populations until 7<sup>th</sup> SMW. While sunshine hours (0.662) had significant positive correlation with aphid population (Table 1). Increasing sunshine hours favours the multiplication of aphid population. The observations are in conformity with the studies of Saxena *et al.*, (2012) they revealed that population of mustard aphid *Lipaphis erysimi* showed a negative correlation with minimum temperature and relative humidity. The okra aphid *Aphis gossypii* had significant positive correlation with sunshine hours during summer season reported by Dabhi *et al.*, (2013) is in agreement with present findings. The current results are in concord with the findings of Patel and Purohit (2013) who reported that aphid *Melanaphis sacchari* on *Kharif* sorghum had significant positive association with sunshine hours and significant negative association with minimum, average temperature, evening RH.

In contrast, maximum temperature, morning RH and

wind speed had non-significant negative correlation with aphid population. The present findings are in accordance with Ahir *et al.*, (2017) who revealed that population of ground nut aphid *A. craccivora* exhibited a non-significant negative correlation with temperature. The present investigation is partially agreement with Panwar *et al.*, (2015) who observed that the population of aphid *Aphis gossypii* had a significant negative correlation with maximum temperature and morning RH in both Bt and non-Bt cotton crops. The aphid populations on cashew was disappeared from last week of April onwards which was due to unfavourable weather conditions.

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