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# POPULATION DYNAMICS OF APHID COMPLEX INFESTING RABI SORGHUM

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**ABSTRACT**

**The present investigation was conducted on aphid complex at the Post Graduate experimental field of Department of Agricultural Entomology, College of Agriculture, Campus Latur, during 2020-21. The results revealed that the aphid *Melanaphis sacchari* reached its maximum in 4$^{th}$ SMW (166.66 aphids / plant). Correlation coefficients revealed that none of the weather parameters had significant effect on *M. sacchari* . *Rhopalosiphum maidis* reached its peak incidence in 5$^{th}$ SMW (40 aphids/ plant). Correlation studies revealed that the before noon relative humidity correlated positively, while wind speed correlated negatively with incidence of *R. maidis*.**

**Key words:** *Melanaphis sacchari, Rhopalosiphum maidis,* significant, variability, IPM

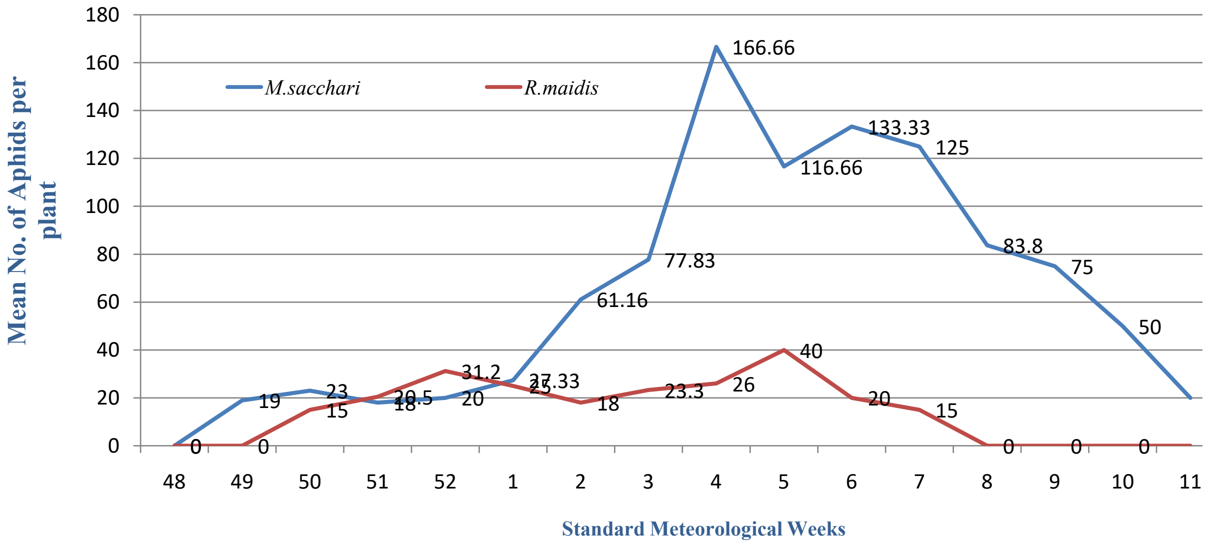
Sorghum *Sorghum bicolor* is a warm-season cereal of African origin (Rosentrater and Evers, 2018). It is grown globally for human and animals for food, feed, fodder, fiber and fuel or bioenergy (Padmaja, 2016). Sorghum aphids, *Melanaphis sacchari* Zehntner and *Rhopalosiphum maidis* (Fitch) are occasional pests. The both nymphs and adults suck sap from the lower surface of leaves and the honeydew leads to sooty molds. (Patel and Purohit, 2013). In sorghum >35% losses are reported due to insect pests estimated at $580 million in India (Reddy and Zehr, 2004). The present study on the population dynamics of the aphid complex in the rabi sorghum was carried out which is helpful to provide the basic information of time of insect attack and development of population dynamics, seasonal incidences the strategies.

## MATERIALS AND METHODS

The field experiment comprising 48 quadrats each of 2.70 x 3.00 m$^2$ was laid at the Research Farm of Department of Agricultural Entomology, College of Agriculture, Latur during rabi, 2020-2021. The popular variety Parbhani Moti was sown at the spacing of 45 x 15 cm with all recommended package of practices recommended by VNMKV, Parbhani (Anonymous, 2018). The population dynamics of aphids was worked out by observations on randomly selected five plants from each of three quadrats twice in each meteorological week. Statistical analysis of incidence in relation to weather parameters was carried out by simple correlation and multiple regression using WASP 2.0 software developed by ICAR Research Complex, Goa.

## RESULTS AND DISCUSSION

The first incidence of *M. sacchari* was observed in 49$^{th}$ standard meteorological week (SMW) (19 aphids/plant) with its peak (166.66 aphids/ plant) in 4$^{th}$ SMW. These results agree with those of Pekarcik and Jacobson (2021) that *M. sacchari* on commercial sorghum varieties significantly differed among locations and reached peak levels during July - August. Balikai and Venkatesh (2019) revealed that the incidence of *M. sacchari* was during third week of January when pest population was at peak. Ghodekar et al. (2017) stated that *M. sacchari* incidence on sorghum started from 2$^{nd}$ or 3$^{rd}$ week of December and reached a peak during 3$^{rd}$ or 4$^{th}$ week of January. Pawar et al. (2014) observed that *M. sacchari* was initially observed on sorghum on the first week of December (90 DAS), increased until the last week of January and declined thereafter. Correlations Coefficient between incidence of *M. sacchari* and weather parameters revealed that most of these factors showed non-significant correlation (Fig. 1). Balikai and Venkatesh (2019) revealed that *M. sacchari* population on rabi sorghum correlated positively and significantly with maximum temperature, but negatively and significantly with morning RH. Karabhantanal et al. (2019) showed that *M. sacchari* incidence was highly variable depending upon the temperature and rainfall. Ghodekar et al. (2017) stated that RH and sunshine hr. showed negative correlation but minimum temperature showed significant negative correlation with *M. sacchari* on sorghum. Pawar et al. (2014) observed negative correlation with minimum temperature. Patel and Purohit (2013) revealed that

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|---|---|---|---|---|---|---|
| Correlation (r) mean no. of *M. sacchari* | 0.191 | -0.099 | 0.141 | -0.002 | -0.256 | 0.043 |
| Correlation (r) mean no. *R. maidis* | -0.174 | -0.452 | -0.422 | 0.584* | 0.277 | -0.648* |

*Significant at 5%

1 *M. sacchari* Y=-600.435+(4.064) x B1+(18.123) x B2 + (-8.202) x B3 + (3.516) x B4 + (2.198) x B5 + (2.512) x B6 + 53.500

2 *R. maidis* Y=136.191+ (-3.665) x B1+(-4.617) x B2+(2.647) x B3+(1.461) x B4 + (-2.126) x B5 + (-1.243) x B6 + 8.198

*$B_1$=Rainfall; $B_2$-Min. Temp.; $B_2$-Max. Temp.; $B_4$-RH before noon; $B_5$-RH after noon; $B_6$-Wind speed (km/ hr)

Fig. 1. Population dynamics of *M. sacchari* and *R. maidis* in rabi sorghum (2020-21)

minimum temperature, morning relative humidity, evening relative humidity and average relative humidity had significant negative correlation with *M. sacchari*. The regression equation revealed that the various weather parameters had profound influence on seasonal incidence. The coefficient of determination ($R^2$) was 0.320 which indicated that different weather parameters contributed 32.00% variability in incidence of *M. sacchari*.

The first incidence of *R. maidis* was observed on in 50th SMW (15 aphids/ plant) with its peak (40 aphids/ plant) in 5th SMW (Fig. 1).

These results overlap with those from Choudhary et al. (2017) on barley. Raj et al. (2019) demonstrated that *R. maidis* on carnation started appearing from December to March. Swaminathan et al. (2016) on maize was more in numbers during monsoon per plant) than during summer. Waleed et al. (2020) evidenced that the *R. maidis* reached its peak on 29th August and 3rd October. Alma et al. (2020) concluded that the maximum infestation of *R. maidis* was found on maize sown in 4th week of November. Sanap and Singh (2018) found that maximum incidence on Isabgol was the one sown on 30th November (tiller) followed by 07th December (tiller) Paul et al. (2020), Tali et al. (2018 a, b), Patil et al. (2015) and Singh and Jaglan (2017) observed that *R. maidis* infesting maize reached its peak in the 39th SMW.

The data revealed that before noon RH (r= 0.584*) exhibited positively significant corelation while wind speed (r= -0.648*) showed negatively significant correlation (r= -0.422).

These results are in accordance with those of Waleed et al. (2020). Singh and Jaglan (2017) observed that *R. maidis* on maize had a highly significant negative correlation with minimum temperature and rainfall. Choudhary et al. (2017) found that maximum temperature exhibited significant negative correlation while relative humidity had significant positive correlation on incidence. Sidar et al. (2015) showed that *R. maidis* had a non-significant positive correlation with morning and evening RH. Patil et al. (2015) reported that non of the weather parameters significantly correlated with *R. maidis* incidence on maize. Jeengar et al. (2010) indicated that temperature should a negative correlation with *R. maidis* on maize. The regression equation revealed that the coefficient of determination ($R^2$) was 0.766 which indicated that different weather parameters contributed 76.6% variability.

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**AUTHOR CONTRIBUTION STATEMENT**

V.K. BHAMARE designed the experiment framework and verified the data and analytical methods. S.K. MEENA wrote the manuscript in supervision and consultation with V.K. BHAMARE. All authors discussed the results and contributed to the final manuscript.

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**CONFLICT OF INTEREST**

No conflict of interest.

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