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Effect of Temperature on Population Buildup of Mustard Sawfly (*Athalia lugens proxima*) and Mustard Aphid (*Lipaphis erysimi kalt*)

K. I. Patel, M. G. Patel, A. M. Shekh, J. R. Patel, M. B. Savani and C. T. Patel

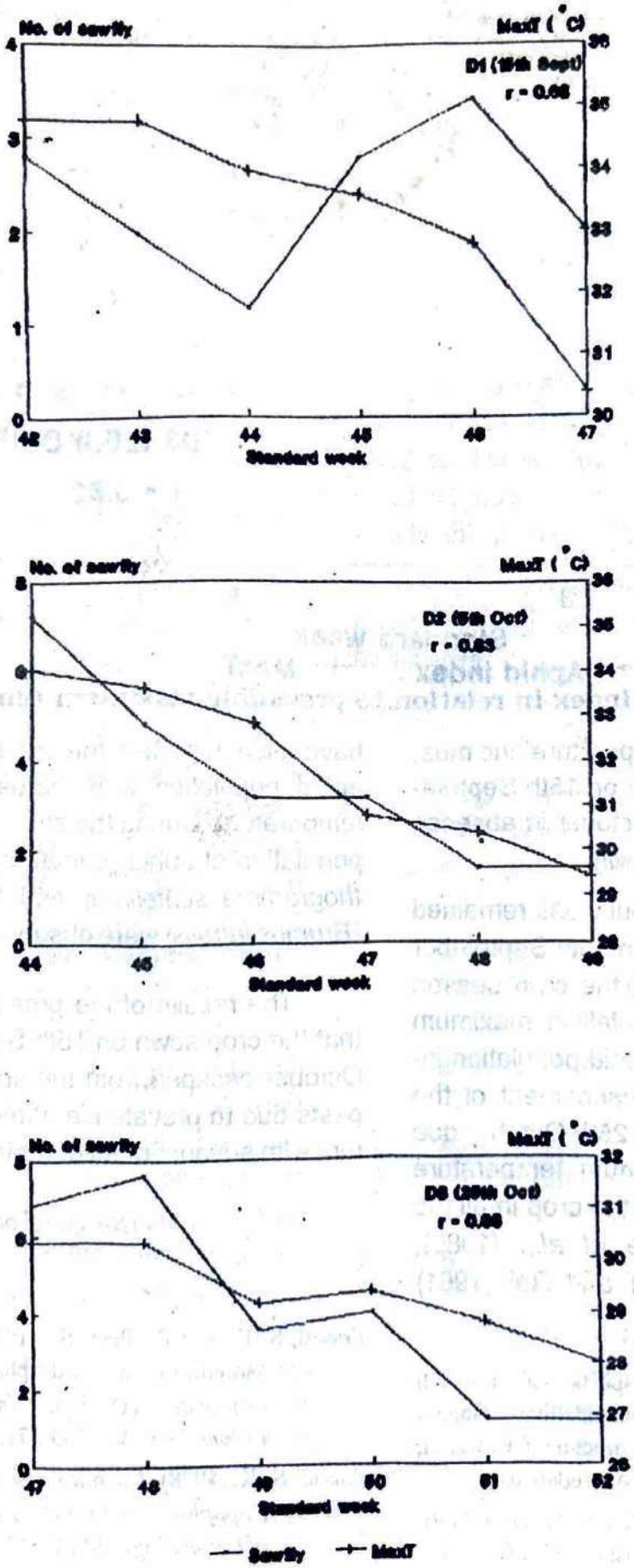
B. A. College of Agriculture, Gujarat Agricultural University, Anand Campus, Anand-388 110

India occupies first position in the world with regard to production and acreage in respect of mustard (*Brassica juncea*) and rapeseed (*Brassica napus*). One of the most serious constraints for production of mustard is the non-availability of pest resistant varieties. Out of 24 types of insect pests that attack these crops, mustard aphid (*Lipaphis erysimi kalt*) and mustard sawfly (*Athalia lugens proxima*) are the major ones. Generally the mustard sawfly appears in the early stage of the crop during October-November, whereas the aphid is found during the flowering stage and causes major damage during December-February. The average loss in seed yield due to mustard aphid was estimated to be 74.3 per cent (Anonymous 1993). Under such a situation, timely plant protection measures the only way to save the crop from the pests in relation to prevailing weather conditions, as weather plays an important role in controlling and rapid multiplication of these pests. Therefore studies were undertaken to know the effect of different weather parameters on the incidence and development of mustard sawfly and mustard aphid populations.

Field experiments on mustard cv. Varuna were conducted in randomized block design at the College Farm of the Gujarat Agricultural University, Anand Campus, Anand with three dates of sowing viz. 15th September (D1), 5th October (D2) and 25th October (D3) during *rabi* seasons of 1988-89, 1990-91 and 1992-93. The plot size was 5.0 x 3.6 meter. The row to row distance of 30 cm was maintained. Number of sawfly larvae were recorded at 0830 hours by observing randomly selected 5 spots each of 900 sq. cm area after three weeks of sowing at weekly interval. The mustard aphid index was also recorded at weekly interval using 0 to 5 indexing as described by Prasad (1978) on randomly selected 10 plants from each plot after 11th week of sowing at 0830 hours. The meteorological data were recorded from the meteorological observatory throughout the crop growing season.

The mustard sawfly population in the crop sown on 25th October decreased as the crop season advanced due to reduction in maximum temperature during the years 1988-89, 1990-91 and 1992-93 (Fig. 1). Slight variations in the individual cases for different dates of sowing were observed due to sudden changes in the prevailing relative humidity. There was a posi-

Fig. 1 : Mustard sawfly population in relation to prevaling maximum temperature.



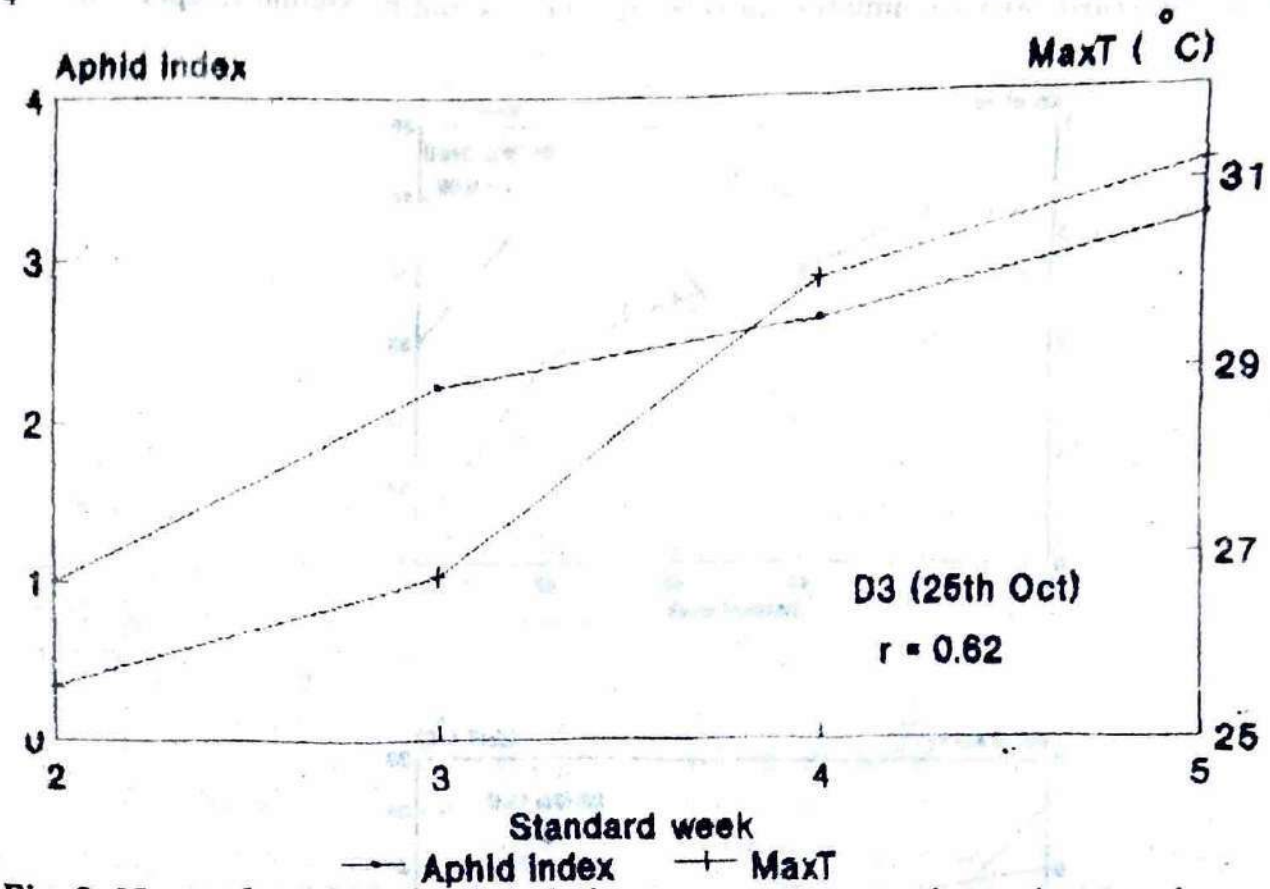


Fig. 2: Mustard aphid index in relation to prevailing maximum temperature

tive association between temperature and mustard sawfly for the crop sown on 15th September, 5th October and 25th October in absence of the *bioagent* of *mustard sawfly.*

The mustard aphid populations remained negligible in the crop sown on 15th September and 5th October throughout the crop season during all the years due to fall in maximum temperature. The mustard aphid population increased rapidly with the advancement of the crop season in crop sown on 25th October due to continuous rise in maximum temperature during the flowering stage of the crop in all the three years (Fig. 2). Sinha *et al.,*. (1989), Prasad and Pradhan (1971) and Rai (1961) have also reported the increase in mustard aphid population with increase in maximum temperature. During the study period negligible population of aphid predators, syrphidfly (*Xanthogramma scutellare*) and Lady bird beetle (*Brumus lutralis*) were observed.

The results of the present study indicate that the crop sown on 15th September and 5th October escaped from the severity of mustard pests due to prevalence of moderate temperature with advancement of winter season.

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