CHAPTER VI

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The present investigation entitled "Ecological studies on the whitebacked planthopper of rice, Sogatella furcifera (Horvath)" was carried out during the years 1985-1988 at College of Agriculture, Indira Gandhi Krishi Vishwa Vidyalaya, Raipur. The objectives were to draw such informations on ecological behaviour of whitebacked planthopper (WBPH) as on seasonal activity, influence of climatological factors on pest population, varietal resistance and cultural, biological and chemical control measures so that an integrated package of pest control measures could be developed.

The most active period of WBPH activity was found to be from 37th to 44th SW (September to October) and the maximum population was recorded in 41st/43rd SW (representing 2nd and 4th week of October) during the years of study. This information will be useful in formulating an effective pest control strategy.

Three years studies, in relation to weather factors and population of WBPH, based on simple correlation revealed that maximum and minimum temperatures...
had no significant effect on the population buildup of this insect. Negative association was observed with rainfall. However, relative humidity and sunshine hours/day play a deciding role in population dynamics of whitebacked planthopper.

The parabolic curves based on second degree quadratic functions were found to be more efficient in predicting pest population. All the weather factors studied were closely related with population buildup as indicated by quadratic functions, a few of them however, had negative relationship.

Number of filled grains per panicle and grain weight were inversely related with number of WBPH nymphs feeding on panicles. The rate of increase in unfilled grain was more when insects fed at flowering stage and grain weight reduction was more when feeding took place at milk stage.

Among the 60 varieties and breeding lines, screened against the pest, only six entries (CR 333-6-1, CR 333-6-2, IET 4695, Ptb 5, Anaikomban and MOI) could be rated as resistant and 13 exhibited moderate degree of resistance.
The mechanism of resistance for WBPH was studied in 10 selected rice varieties along with resistant and susceptible checks. All the eleven resistant and moderately resistant varieties (including standard resistant check IET 6288) had attracted low number of WBPH nymphs for shelter/feeding as compared to susceptible TN1. Antibiosis tests revealed that the nymphal survival was significantly lower on resistant (38-52%) and moderately resistant (52-56%) varieties as compared to susceptible (80%) cultivar TN1. Similarly, growth index values were also affected depending on the degree of resistance of the varieties tested. Higher number of probing punctures were observed in resistant varieties. The amount of honeydew excreted by WBPH adult females released on susceptible TN1 was 3-4 time more as compared to resistant and moderately resistant varieties. The studies revealed that nonpreference and antibiosis have a definite role in manifestation of resistance in varieties.

It is suggested that varieties, breeding lines and donors which have shown resistant rating in the present study should be included in local breeding
programme for incorporating resistance into new varieties to fulfill the immediate need of local farmers. These varieties provide insect control at no cost, act as preventive measure against population buildup and also avoid pollution problems.

The crop planted up to 3rd week of July attract significantly less number of WBPH than the delayed plantings. Seedling age at planting had no significant effect on the population buildup of pest. There was a positive significant correlation between nitrogen level and population of WBPH/hill. The regression analysis showed that with the addition of every one kilogram of nitrogen/ha, there was an increase of 0.14 insect/hill. It is evident that early planting coupled with judicious use of nitrogenous fertilizers can play a vital role in checking the WBPH population.

Among 10 insecticides tested, carbaryl (86.57%) and BPMC (86.38%) showed a high degree of ovicidal action against eggs of WBPH. Considering both ovicidal activity and mortality of newly emerged nymphs, BPMC and carbaryl gave highest kill (99.99%) followed by chlorpyriphos (88.78%), monocrotophos (75.64%), phosalone (74.60%) and quinalphos (71.1%).
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four were poor in this respect. Looking to knockdown property and persistent toxicity carbaryl was found to be most effective followed by monocrotophos, BPMC, chlorpyriphos and quinalphos and can also be used in controlling the WBPH under integrated pest management system.

In this region, spiders (three species of *Tetragnatha* and *Pardosa birmanica*), mirid bug, (*C. lividipennis*) and beetles (specially *P. fuscipes*) were invariably found to be occurring in considerable numbers in rice fields throughout the crop period. The conservation of these predators for utilizing them as natural method of pest control, therefore, needs consideration by adopting judicious plant protection measures in integrated pest management programmes of whitebacked planthopper.