SUMMARY, CONCLUSION AND SUGGESTION FOR FUTURE RESEARCH WORK
CHAPTER – VI
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The present study entitled "Inheritance and Linkage studies of gall midge resistance in some rice varieties of Chhattisgarh." were undertaken during Kharif 2002, Rabi 2002-03, Kharif 2003 and Kharif 2004, in the Department of Plant Breeding and Genetics, Indira Gandhi Agricultural University, Raipur, Chhattisgarh, with the following objectives:

1. To study inheritance of gall midge resistance in some of the known resistant cultivars of rice.

2. To investigate and confirm inheritance of purple leaf colour in rice.

3. To find out linkage relationship of gall midge resistance with purple leaf colour.

The experimental material consisted of 5 parents, four resistant and one susceptible their F1, F2 populations and F3 progenies. Crosses were made during Kharif 2002-03. The F1s were grown in Rabi 2002-03 & Kharif 2003 and Kharif 2004 to advance the generation for screening against gall midge resistance, the sowing of parents, F1, F2 and F3 progenies were delayed till first week of
August to synchronise the build up of adequate pest population with active tillering phase of the crop. Heavy doses of nitrogen were applied to enhance the tillering, succulencey and susceptibility of the crop plant against the gall midge. Artificial light was provided during night to attract female gall midge egg laying at the time of active tillering phase.

The f1’s were harvested individually. The F2 populations were planted single seedling per hill and harvested individually. The plant to plant distance was 15 cm apart and row to row distance 20 cm were maintained. Fifty random F2 plants were harvested individually to raise F3 generations. The progenies of a single plant F2 were grown in a row. Each cross population was surrounded by two row of purple leaf, gall midge susceptible variety, Shymala to spread the insect population throughout the field. Individual plant was scored for resistant or susceptibility. The presence of single silver shoot per hill was taken as a criterion of susceptible.

The chi-square ($\chi^2$) test was applied to test the goodness of fit, so as to derive appropriate conclusions relating to mode of inheritance, and for detection of linkage between the genes governing purple leaf colour and gall midge resistance. Minimum discrepancy method was applied for the estimation of linkage values.
Based on the results obtained the following conclusions were drawn:

1. The crosses of test varieties with susceptible variety, shyamla revealed that each resistant variety *viz.*, Jaldubi, Abhaya and Madhuri A-9 possessed a single dominant gene for gall midge resistance.

2. Inheritance pattern of purple leaf variety Shyamla revealed that three genes C, P1 and IP1 were responsible for presence of purple leaf colour. Out of these three genes two complementary gene C and P1 were present in pigmented variety Shyamla, whereas an inhibitory gene IP1 was present in green leaf varieties.

3. In only one cross of shyamla with Jaldubi showed presence of a Linkage between the genes for gall midge resistance and purple leaf colour was revealed.

4. In cross Shyamla X Jaldubi a cross over value 0.35 was obtained which indicated that gene IP1 and Gm resistant gene are located at a distance of 35 per cent map unit.

**SUGGESTIONS FOR FURTHER WORK:**

In the present study for linkage relationships of gall midge resistant gene and purple pigment, three crosses showed
no linkage but indicated linkage in only one cross. Thus this should be further confirmed with more number of crosses. The resistance in showing gall midge resistant varieties are governed by major genes and clear indication of vertical resistance therefore it would be very easy to identified the diverse sources of resistance and transfer them in a variety to pyramid the non allelic resistant genes thus a super resistant variety may be developed which may combote with changing biotypes of pest and break down of resistance.