

Variation in virulence in populations of the brown planthopper, *Nilaparvata lugens* in Asia

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Nilaparvata lugens (Stål) is effectively specific to cultivars and wild species of rice (*Oryza*) in Asia where it is a major pest. Populations have been isolated at the International Rice Research Institute (IRRI), Philippines, which show distinct patterns of virulence on rice varieties which incorporate different genes for resistance. These have been thought to be genetically homogeneous and termed Biotypes 1, 2 and 3 with the ability to survive respectively on cultivars with no gene for resistance (eg. TN1), gene Bph 1 (eg. Mudgo), and gene Bph 2 (eg. ASD7).

The inbred biotype cultures at IRRI show great individual variability in virulence (Claridge & Den Hollander, 1980) and virulence seems to be inherited by a system of polygenes and not by simple major genes (Den Hollander & Pathak, 1981). Selection experiments on appropriate cultivars over eleven generations showed that it is possible to convert one so-called biotype into a population with virulence characters of another.

An allopatric population from Queensland, Australia, behaved to TN1, regarded as universally susceptible, as if it were resistant. It was cultured in Cardiff on the French variety Delta. Selection experiments were made on this population. After great problems of low survival in the early generations, a population was selected able to survive and reproduce on TN1. It resembled Philippine 'biotype 1' in virulence characteristics. In other respects the Queensland population showed considerable genetic differentiation from Philippine ones (Claridge et al., 1982).

Field populations of *N. lugens* were sampled from five different cultivars and from wild rice (*O. rufipogon*) in Sri Lanka in July, 1980. The populations were tested for virulence in the laboratory in Cardiff on the varieties from which they were collected and on the standards – 'TN1', 'Mudgo' and 'ASD7'. Most populations showed distinct patterns of virulence and evidence of close adaptation to their own varieties. One even showed lack of virulence on 'TN1'. Thus, even within a small geographical area, there is good evidence for local variation in virulence.

We conclude that *N. lugens* populations are highly labile for virulence characteristics and susceptible to rapid adaptation by natural selection. The biotype terminology is thus not appropriate to this species.

References

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