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THE BROWN PLANT HOPPER AS A RECURRENT DANGER TO HIGH-YIELDING RICE CULTIVATION

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ABSTRACT

The brown planthopper (BPH), Nilaparvatalugens, which erupted occasionally in tropical Asian rice in the sixties, became a great danger after the adoption of green revolution technology by farmers in the 1960s. In the 1980s and 1990s, management and regulatory reforms highlighted non-insecticide methods to prevent BPH epidemics. However, as main method for managing rice insect pests, pesticides have reappeared and recent planthopper outbreaks have occurred in record numbers in tropical Asian nations. Our examination of variables contributing to the epidemics shows that pesticides are mainly the most significant outbreak contributor in terms of their negative impact on natural enemies. BPH resistance to insecticides and particularly Imidacloprid enhanced the likelihood of outbreaks because farmers used increasing amounts of pesticide to fight resistant populations. Similarly, excessive use of nitrogen fertilizer in hybrid rice, in particular, has enhanced the epidemic risk. Other variables that are less established are causing outbreaks, however we explore the potential that high outbreak synchrony in geographically dispersed BPH populations may indicate a 'Moran effect' as a climate that favors the above-average growth in the populations of BPH. We further assume that BPH works as a meta population, and that recurrent outbreaks may thus constitute a natural occurrence which would need plant hoppers to return to the empty regions in order to maintain genetic interconnections between subpopulations. We finish by recommending a number of research and policy reforms to better understand the origin of BPH outbreaks and to create sustainable management methods to avoid repeat outbreaks.

KEYWORDS: *Fertilizers, Green Revolution, Insecticide, IRRI, Planthopper.*

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