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# Plant Crops Production in Asia

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**Abstract**

Most crops showing damage had already headed, although crops suffered some damage at all growth stages. In many fields the damage was so great that growers abandoned the crop. The loss in grain yield ranged from 10% in moderately affected fields to 70% in those severely affected. The damage to the standing crop sometimes reached 100%. The estimate was arrived at by adding losses of various degrees in different areas.

**Keywords:** Standing crop; Hopper burn; Crop season; Japan; Brown plant hoppers; Infestations

## Introduction

The estimated losses in Kerala from 1973–74 to 1975–76 total almost US$12 million. Other states of India have also reported brown plant hoppers infestations and damage. Ghose noted that N. lugens was a minor pest in Andhra Pradesh. The insect has since become a serious pest. About 200 ha was hopper-burned and 3,250 ha was severely infested. During 1973 several thousand hectares were affected in Orissa. Chatterjee reported that the formerly minor insect N. lugens had assumed serious proportions on rice in two northern districts of West Bengal. It caused serious damage to both autumn and winter crops [1]. There was an outbreak in one district of West Bengal in 1975, and in several cases the crop was destroyed. Hopper burn occurred in two districts of Himachal Pradesh in 1973 and 1974. Chelliah and Subramanian mentioned that the brown plant-hoppers occurs in epidemic form once every few years in Tamil Nadu and causes extensive damage. The incidence of the pest was especially high in 1969 and 1971, and Das reported a devastating outbreak in 1972. In Coimbatore district in the 1975 wet season, about 200 ha of rice fields was severely infested, and some hopper burn occurred. The brown plant hoppers have evidently been a pest of rice in Japan since ancient times. Out - breaks date back to AD 697 or 701. Since then there have been numerous records of outbreaks, many covering large areas, and some causing severe famine. In 1897, 960,000 tons of rice was lost. That was equivalent to a loss of 18.49% for all of Japan. Crop damage from N. Iugens usually occurs in the same year as that from Sogatella furcifera, but S. furcifera reaches its peak before N. lugens early in the crop season [2]. The latter species may do more damage, since it is most dense during the reproductive period. Mochida observed that over a 10-year period in Kyushu, the yield losses due to insects and diseases in untreated experimental plots averaged 53%. The greater part of the loss was attributed to insects, especially to N. lugens. Severe hopper burn occurred in 1967 and in 1969 when light-trap catches were high. The correlation coefficient between the occurrence of N. lugens in light traps and yield was –0.637. Thus the brown plant hoppers appeared to be the major cause of the yield losses due to pests. In ancient Korean records, 36 out of 167 references to insect infestations can possibly be attributed to planthoppers. Hopper damage was reported as early as 18 AD. Since 1912 the brown plant hoppers has been authentically recorded four times, and about 10 outbreaks probably have occurred. The pest infested fields in many provinces in 1912; infestations also occurred in 1921, 1922, and 1923. The brown plant hoppers problem has increased during the last 10 years, although the severity of outbreak varies with season. Some damage occurred in 1965, 1966, 1967, 1969, and 1970. Brown plant hoppers outbreak was most severe in 1975 in the south-western part of Korea; it mainly affected the late-maturing local varieties [3]. The insect fed extensively on plants past the heading stage. Plant-hoppers and leafhoppers infested 1.745 million ha of rice in 1975, but only 200,996 ha in 1973 and only 497.507 ha in 1974. The yield loss in 1975 ranged from 24 to 38% in hopper-burned areas and from 2 to 20% in fields that were infested but not hopper-burned. It may be valued at US$10 million [4]. The brown plant hoppers used to be a minor pest in Malaysia. In Sarawak, no outbreak has ever been recorded nor has the pest alone caused appreciable crop damage. But in 1967 the BPH and Sogatella furcifera together attacked and destroyed more than 5,000 ha of paddy fields in West Malaysia. Losses were about US$1 million. A little hopper-burn, affecting about 8 ha, was seen in 1968. Recently small outbreaks of the BPH on New Ireland, New Britain, and the New Guinea mainland, with a few hectares hopper-burned, were reported. Hale and Hale noted that in New Ireland the pest caused complete loss of the crop in several fields, and damaged other fields [5]. The earliest recorded damage by the brown plant hoppers in the Philippines occurred in Calamba, Laguna, in 1954. Cendaña and Calora mentioned that an attack by the pest in 1959 in the same town destroyed all fields planted to the variety Milfor. In Ilocos Norte province in the wet season of 1957-58, the brown plant hoppers caused extensive damage to irrigated lowland rice; even seedbeds were destroyed. Some plots on the IRRI farm were hopper-burned in 1964. Since 1966 catches of brown plant hoppers in IRRI light traps gradually increased and reached a peak in 1973. Probably BPH incidence similarly increased in many parts of the country, since serious outbreaks occurred in numerous provinces in 1973. The 1973 infestation affected most rice-producing provinces. Brown plant hoppers list 21 provinces with serious infestations and 14 provinces with moderate infestations. Pest populations reached explosive levels, and hopper-burn was a common sight. The actual yield losses in the infested provinces were not reported. But Cramer's method for calculating losses estimates the 1973 yield loss for the country as a whole to be about 150,000t, worth about US$20 million. Probably the worst infestation in 1973 occurred in Laguna province, where thousands of hectares were infested [6]. Brown plant hoppers and the grassy stunt disease damaged 85% of the province's rice fields. In some towns the pest destroyed the crop. About

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700 ha was hopper-burned, and the yield worth more than US$200,000 was lost. In general, the pest problem was much reduced in 1974, although infestations and some damage were reported. In 1975 the Brown plant hoppers infested a thousand or so hectares in Nueva Ecija province and a few hectares were hopper-burned. In 1976, damage, especially by Brown plant hoppers biotype 2, was reported in Mindanao. IRRI light-trap catches of Brown plant hoppers in 1976 showed insect resurgence. In the Philippines the Brown plant hoppers infested a total of 50,000 ha in late 1976 and caused a yield loss of about 20%. About 1,000 ha were hopper-burned. The national loss incurred, about 0.75%, was worth US$6 million. The Brown plant hoppers continue to be a threat possibly the major insect threat to rice production in the Philippines [7]. When rice was first grown in the Solomon Islands in the early 1960's, the Brown plant hoppers was a serious pest. Difficulties in controlling the insect stopped rice production for some time. After production was resumed, the pest was controlled effectively for a few years. But an outbreak in 1974 caused some hopper-burn and a total crop loss amounting to about US$120,000. Although an outbreak has not recurred, some damage was again reported in 1975. Sri Lankan some authors regard plant-hoppers as very important insect pests of rice in Sri Lanka. Over the past 10 years Brown plant hoppers have appeared in large numbers in several parts of the country, and occasionally have caused hopper-burn. In Ampari district the pest became serious in recent years. In 1974 about 16,200 ha was attacked to some degree, and 2,800 ha of rice was destroyed. Yield loss amounted to about US$1 million. Taiwan Before 1960, the BPH occurred only sporadically. In Taiwan since 1960 it has been a major insect pest. It is generally considered as the principal insect pest of rice. Now it is widely distributed and destructive. Outbreaks occurred in central and southern Taiwan during the second crop seasons of 1966, 1967, 1970, 1974, and 1975 [8]. The insects infested more than 100,00 ha of rice fields, about 25% of the total area under rice. It also caused severe damage in some parts of southern Taiwan during the first crop seasons of 1966 and 1969. In spite of the extensive use of insecticides, the rice yield annually lost to Brown plant hoppers in 1972-75 ranged from 16,140 to 55,584 t. In 1975 the estimated value of the lost crop was US$9,715,000 [9]. The amount excludes US$28,701,298 that farmers spent to control the insect. No damage from the Brown plant hoppers was noticed in Thailand before 1974. But in that year's dry season the pest population in the Central Plain area became very high. The insects spread throughout the Central Plain and caused hopper-burn. A small outbreak developed west of Bangkok. Some pest problem occurred in 1975 and insecticides were applied to control it. In 1971 Ngoan reported that plant-hoppers and leafhoppers were causing more damage in Vietnam than they did before 1967. Damage by plant-hoppers seemed to be the major insect-limiting factor in rice production. N. lugens, which has become increasingly abundant every year, has formed outbreaks [10].

## Conclusion

Hopper-burn is caused mostly by N. lugens, not by Sogatella furcifera, Thousands of hectares have been destroyed every year, and yields possibly worth US$3 million have been lost. According to Huynh, the Brown plant hoppers have been the most serious insect pest of rice in Vietnam since 1970. Hopper burn occurred in 1975 at several locations in the Mekong Delta area.

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## Conflict of Interest

None

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