control the disease economically.

For optimum expression of genetic resistance or susceptibility to BS under natural disease pressure, MM and EM varieties are sown on or after 1 and 20 Jul, respectively. For NBLS, however, sowing is delayed another 15 to 20 d. EM varieties that escape NBLS when ratooned face maximum disease pressure and score 0 to 9. LM varieties get sufficient disease pressure even under TS situations. □

Control of rice bacterial blight (BB) by nickel nitrate

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We screened several chemicals to control rice BB. Rice variety IR20 was grown in the field Sep-Dec 1987. Chemicals at 3 concentrations were sprayed at the boot leaf stage, with 3 replications of 10 plants each for each treatment. The top 3 leaves were clip inoculated 24 h after spraying with a virulent isolate of *Xanthomonas campestris* pv. *oryzae* at 10^8 colony-forming units/ml. Disease intensity was scored on 25 randomly selected leaves 20 d after inoculation and % leaf area affected was calculated (see table).

Nickel nitrate at 10^{-2} M effectively controlled the disease. No other chemical was effective. Nickel nitrate at 10^{-2} M to control BB was verified in 2 more independent tests in the greenhouse. □

Effect of different chemicals in inducing resistance to rice BB. Aduthurai, India, 1987.

Chemical	Concentration	Disease intensity	
		Grade value	Leaf area affected (%)
Nickel nitrate	10^{-2} M	1.8	3
	10^{-3} M	5.8	35
	10^{-4} M	6.5	44
Sodium fluoride	10^{-2} M	5.7	34
	10^{-3} M	7.4	60
	10^{-4} M	7.3	58
Calcium sulfate	0.2%	7.2	55
	0.5%	6.8	48
	1.0%	6.0	38
Magnesium sulfate	0.2%	5.8	35
	0.5%	6.8	48
	1.0%	6.2	40
Copper sulfate	0.2%	5.9	36
	0.5%	5.3	29
	1.0%	6.2	40
Ferrous sulfate	0.2%	5.9	36
	0.5%	6.8	48
	1.0%	6.3	41
Zinc sulfate	0.2%	6.3	41
	0.5%	7.0	50
	1.0%	7.7	68
Ammonium molybdate	10 ppm	6.3	41
	50 ppm	6.9	49
	100 ppm	7.0	50
Control		7.5	62
LSD (P=0.05)		1.3	2

Insect management

Brown planthopper (BPH) outbreak in Kanchana Buri Province, Thailand

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BPH *Nilaparvata lugens* (Stål) has been a major insect pest of rice in the Central Plain of Thailand since 1973 dry season (DS), but there was no record of serious outbreaks in Yanchana Buri. In April 1988 DS under high temperatures (av > 35 °C) at Kaosamsibhap Village, Tamaka District, BPH infestation occurred on about 240 ha with continuous irrigation and water standing in the fields.

It caused typical hopperburn symptoms on about 12.8 ha of rice variety RD7 (C4-63/GR88/ / Sigadis). The remaining area, planted to resistant variety RD23 (RD7/IR32//RDl), was not affected.

Double the recommended N (160 kg/ ha) had been applied as topdressing fertilizer at 40 d after sowing (DAS). Farmers sprayed monocrotophos 2-3 times to control rice thrips, leaffolder, and stem borers.

It is likely that these insecticide applications also caused the BPH outbreak. BPH populations sampled in untreated fields exceeded 100 hoppers/ hill 83 DAS. Those populations probably came from fields with BPH resurgence. Populations of natural enemies of BPH (mirid bug and wolf spider) also were abundant. □

Chemical control of thrips and gall midge (GM) in rainfed lowland rice

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We evaluated insecticides against GM *Orseolia oryzae* during 1988 wet season