Rate of seed set appears to be the most stable yield component, followed by 1,000-grain weight, plant height, panicle length, and harvest index (see table). The most unstable traits are grain yield/plant, total weight/plant, and panicle/plant.

Two or three seedlings/hill appears to yield best. ■

Effect of seedlings/hill on plant yield and yield components. Wuhan, China, 1989.

Seedlings/ hill (no.)	Plant height (cm)	Panicles/ hill (no.)	Panicles/ plant (no.)	Panicle length (cm)	Spikelets/panicle (no.) Fertile	Spikelets/panicle (no.) Total	Seed-set rate (%)	1000-grain weight (g)	Grain yield/hill (g)	Grain yield/plant (g)	Grain weight/hill (g)	Grain weight/plant (g)	Harvest index
1	79.0	5.0	5.0	18.0	74.6	83.4	89.4	24.3	9.2	9.2	15.6	15.6	0.5
2	82.2	5.6	2.8	18.7	72.7	81.3	89.4	24.4	9.9	5.0	15.6	7.8	0.5
3	81.8	7.4	2.5	17.4	74.1	82.2	90.1	23.5	12.9	4.3	21.8	7.3	0.5
4	80.4	9.0	2.3	17.0	61.5	69.9	88.0	23.7	13.0	3.2	23.4	5.8	0.4
5	84.4	10.4	2.1	17.3	58.0	66.0	87.8	23.5	14.1	2.8	26.2	5.2	0.4
Mean	81.6	7.5	2.9	17.7	68.2	76.6	89.0	23.9	11.8	4.9	20.5	8.4	0.5
CV (%)	2.5	30.4	40.1	3.7	11.5	10.5	1.1	1.8	18.2	51.6	23.2	50.1	5.5

Integrated pest management — diseases

Status of rice blast (Bl) in eastern Uttar Pradesh, India

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Rice is primarily grown as a hot-wet season (1 Jun-30 Nov) crop in eastern UP. Before the introduction of TN1, IR8, Jaya, and other high-yielding varieties, Bl affected extensive rainfed rice areas. With the introduction of modern varieties, the area under irrigation increased. Varietal resistance and less frequent moisture stress reduced early and severe Bl attack. With the consequent reduction in inoculum load and discontinued use of susceptible varieties, the area affected by Bl shrank considerably.

By mid-l970s, Bl had been confined to the submountain regions of Gonda, Bahraich, Basti, and Gorakhpur districts, (the eastern tarai). There, nearness to inoculum from Nepal and much more frequent cultivation of susceptible traditional rainfed varieties made it possible for the disease to recur each year.

The disease starts at the seedling stage (May) and eventually covers leaves, sheaths, nodes, panicle stalk, panicle node, and panicle proper. In years with several drought stress periods of 10 d or more, rainfed rice becomes uneconomic to harvest.

Our surveys of farmers' fields and experimental plots 1977-89 indicate B1 incidence in the eastern plains as well. Jarhan seedlings raised under rainfed conditions at Faizabad are infected by Jul and, in years with even short droughts, are defoliated by mid-August. Under irrigation, foliar Bl pressure remains low even on varieties that are susceptible when grown under rainfed conditions.

Neck Bl is common to all ecosystems, both in the tarai and in the eastern plains. With the introduction of neck Bl-susceptible varieties, it has become a serious problem. Bl is increasing in extent and intensity with the increase of the area under better fertility. ■

Distribution of bacterial blight (BB) in Nepal

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We surveyed 32 rice-growing districts in the Terai and important rice-growing districts in the hills to map the distribution of BB disease. Areas inspected were mostly along the national highways. Disease incidence was calculated on a 1-m^2 area at each site as number of infected leaves/hill × 100.

Table 1. Distribution of BB in Nepal, 1986-89.

District	Sites surveyed (no.)	Average field infection (%)
Jhapa	5	>50
Morang	4	>50
Sunsari	3	10-25
Dhankuta	2	10-25
Saptari	3	26-50
Dhanusa	7	10-25
Siraha	6	10-25
Mahotari	6	10-25
Sarlahi	5	26-50
Rautahat	2	10-25
Bara	13	>50
Parsa	15	>50
Chitwan	6	10-25
Nawalparasi	4	10-25
Rupandehi	7	26-50
Kapilvastu	4	10-25
Dang	8	26-50
Banke	5	10-25
Bardiya	6	10-25
Kailali	4	26-25
Kanchanpur	12	>50
Palpa	2	26-50
Syanja	3	10-25
Kaski	3	26-50
Tanahu	5	>50
Gorkha	1	<10
Kathmandu	5	>50
Bhaktapur	6	10-25
Lalitpur	4	10-25
Nuwakot	5	<10
Kabhre	4	10-25
Sindhuli	5	10-25
Total	170	

Terai districts Jhapa, Morang, Bara, Parsa, and Kanchanpur had the highest BB infection (Table 1). In the hills, Tanahu and Kathmandu districts had the highest.

Table 2. Resistance to bacterial blight of some rice cultivars grown at sites surveyed in Nepal, 1987-89.

Cultivar	Location	District	Disease reaction[a]
Masuli	Urlabari	Jhapa	MS
	Shibagunj	Jhapa	S
	Ramdaiya	Dhanusa	S
	Janakpur	Dhanusa	HS
	Lahan-6	Siraha	MS
	Hapur	Sarlahi	S
	Hariwan	Sarlahi	S
	Panwanipur	Bara	HS
	Jagamath-7	Parsa	MS
	Jagannathpur	Parsa	MS
	Saradanagar	Chitwan	MS
	Bharatpur	Chitwan	S
	Bhandara	Chitwan	S
	Gaidakot	Nawalparasi	MS
	Tharunagar	Nawalparasi	S
	Sidarthnagar	Rupandehi	S
	Paruwa	Rupandehi	S
	Parsari	Rupandehi	S
	Gularia	Bardiya	HS
	Mahendranagar	Kanchanpur	S
	Bayarghari	Syangja	S
	Raniguan	Tanahu	S
	Sindheshore-6	Sindhuli	MS
CH45	Jamuniya	Dhanusa	HS
	Naktajhil	Dhanusa	S
	Baluwa-9	Bara	HS
	Rampur Tokan	Bara	HS
	Buniyad-3	Bara	HS
	Bhaubari-4	Parsa	MS
	Jagamathpur	Parsa	HS
	Lipani birta-2	Parsa	S
	Lipani birta-10	Parsa	HS
Himali	Bhjandara	Chitwan	HS
	Jorpati	Kathmandu	HS
	Dillibazar	Kathmandu	HS
	Bhaktapur	Bhaktapur	MS
	Battar bazar	Nuwakot	HS
	Gauribis	Nuwakot	HS
Sarju 49	Basabasai	Nawalparasi	HS
	Sidarthnagar	Rupandehi	S
	Maduali	Rupandehi	HS
	Parsari	Rupandehi	HS
	Shibapur	Kapilvastu	S
	Bade	Kapilvastu	HS
Bindeshwori	Sunwari	Sunsari	S
	Rampur Tokan	Bara	HS
	Feta-1	Bara	HS
	Liponi Mal	Parsa	HS
	Sindheshore	Sindhuli	HS
Janaki	Belbasi	Morang	S
	Monkapur	Banke	MS
	Mahendranagar	Kanchanpur	HS
	Khampacamp	Nuwakot	MR
Muturi	Simroungard	Bara	HS
	Jagmath	Parsa	HS
	Pokharia	Parsa	S
Laxmi	Padariya	Siraha	MS
	Mahendranagar	Kanchapur	S
IR24	Mahendranagar	Kanchapur	S
	Mahendranagar-16	Kanchapur	S

[a] Resistant (R) = no disease symptom in the field, moderately resistant (MR) = plants with less than 10% leaf blighted, moderately susceptible (M) =plants with 10-25% leaf blighted, susceptible (S) = plants with 26-50% leaf blighted, highly susceptible (HS) = plants with more than 50% leaf blighted.

BB-susceptible Masuli was the most extensively grown cultivar in the 23 sites surveyed (Table 2). IR24 was the only IR cultivar grown (in Kanchanpur district, western Nepal). ■

Timing of insecticide treatment for rice tungro (RTV) control

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We studied the effect of treating the nursery and transplanted seedlings with a combination of knockdown and insectistatic compounds for RTV control, using green leafhopper (GLH)- and RTV-susceptible IR22.

Eight treatments were compared: no insecticide; applying insecticides in the nursery only, at 12 d after seeding (DAS); applying 2 d after transplanting (DT) only; applying 16 DT only; applying in the nursery and 2 DT; applying 2 and 16 DT; applying in the nursery and 16 DT; and applying in the nursery, 2 and 16 DT. Plants were sprayed with cypermethrin at 25 g ai/ha and buprofezin at 500 g ai/ha.

RTV infection in the nursery was determined by enzyme-linked immunosorbent assay (ELISA) at 21 and 26 DAS. Groups of seedlings were collected at random from 42 sampling points along the length of the nursery. Each group, averaging 18 seedlings, was tested separately.

Disease transmission by 80 leafhoppers collected in the nursery by insect net at 13 DAS was also tested.

Seedlings were transplanted 26 DAS in 10-m^2 plots in a randomized complete block design with four replications. RTV infection at 14, 33, and 61 DT was determined by ELISA from 10 samples/plot, sampled in a W-pattern. Each sample consisted of 16 hills.

Seedlings from the untreated nursery at 21 DAS showed 4% infection by rice tungro bacilliform virus (RTBV) alone and 7% infection by rice tungro spherical virus (RTSV) done; seedlings from the treated nursery had 2% infection by RTBV alone. AT 26 DAS seedlings from the treated nursery had 2% infection by RTBV alone; those from the untreated nursery had 2% infection by RTSV alone.

No GLH were collected in the treated nursery 13 DAS. GLH were collected in