Tungro viruses in volunteer rice plants

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Rice tungro bacilliform virus (RTBV) and rice tungro spherical virus (RTSV) reportedly survive in rice stubble, weeds, and wild rice species, which then act as sources for reinfection of succeeding rice crops. We studied whether volunteer rice plants that germinated from seeds spilled after threshing harbor RTBV, RTSV, and tungro vector insects.

We surveyed 5-16 threshing sites used in the 1990 dry season crop in Magarao and Pili, Camarines Sur; Barotac Nuevo, Iloilo; and Isulan, Sultan Kudarat. Sites covered areas of 2-5 ha in tungro endemic fields. Sweep nets were used to determine the number of tungro vectors in 3- to 4-wk-old volunteer rice plants. Enzyme-linked immunosorbent assay (ELISA) was used to determine the presence of tungro viruses on 10-20 batches of 10 seedlings/site.

More leafhopper vectors were collected in Sultan Kudarat than in Camarines Sur and Iloilo, although leafhoppers were present at most sampling sites (see table). Camarines Sur samples had no infection.

Low composite infection of RTBV and RTSV was obtained even though testing the plants in batches increases the chances of detecting double infection. The results indicate that single infection of RTSV is predominant in the field, even in volunteer plants.

Results show that volunteer rice plants are infected by tungro viruses and harbor tungro vectors. They can serve as direct sources of infection and tungro vectors for the succeeding crop, especially in asynchronously planted fields. □

Tungro vector density and percentage RTBV and RTSV infection in volunteer rice plants in 3 Philippine provinces, 1990 DS.

Location	Sampling sites (no.)	Av vector density[a] (no.)	Batches tested[b] (no.)	Batches (no.) of seedlings infected with		
				RTBV + RTSV (%)	RTBV (%)	RTSV (%)
Camarines Sur	5	4.4	77	0	0	0
Iloilo	12	2.5	239	3.7	0.4	17.5
Sultan Kudarat	16	19.0	317	4.4	1.9	21.3

[a]Leafhopper catches per 10 sweeps. [b]Batches of 10 seedlings were assayed separately by ELISA.

Integrated pest management—insects

Sweep net efficiency as affected by insect stage and sex, pipunculid parasitism, and rice stage

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Sweeping with an insect net is a common method of assessing green leafhopper (GLH) *Nephotettix virescens* populations. The interpretation of population parameters based on raw sweeping data, however, may be misleading if sweeping efficiency varies among samples.

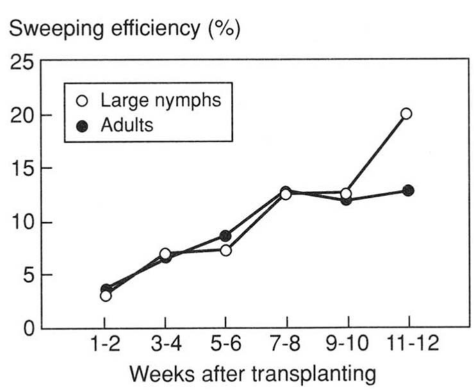
Sweeping efficiency for *N. virescens* adults.[a]

Rice stage (WT)	Efficiency (%)			
	Healthy mature females	Healthy immature females	Healthy males	Parasitized males and females
1-4	2.48 a	3.84 a	10.93 a	12.74 a
5-8	4.12 b	5.69 b	12.91 b	17.96 ab
9-12	5.87 b	6.94 b	13.74 b	23.11 b

[a]In a column, means followed by the same letter are not significantly different at the 5% level by Kruskal-Wallis/Scheffe's multiple range test.

We studied the effect of insect stage and sex, pipunculid parasitism, and rice stage on sweeping efficiency for GLH. We made weekly population counts by sweeping and by the Farmcop sampler in 17 ricefields where Krueng Aceh had been transplanted at 3-5 plants/hill, at 25-cm spacing. Sweeping samples were taken using 125 strokes of a 42-cm-diam insect net at 1-12 wk after transplanting (WT). A Farmcop count was made at twenty 4-hill spots in the same fields prior to sweeping.

Sweeping efficiency was calculated as the ratio of sweeping catches/stroke to Farmcop catches/spot. Mean sweeping efficiencies in all of the fields were 0.090 (0.056/0.619) for large nymphs (3d to 5th instar), 0.030 (0.008/0.268) for healthy mature females, 0.055 (0.014/0.253) for healthy immature females, 0.125 (0.044/0.353) for healthy males, and 0.182 (0.016/0.088) for pipunculid-parasitized males and females. Differences in the mean catches between the two methods were significant ($p<0.01$ by t-test) for all GLH categories.



Sweeping efficiency (%) for *N. virescens* large nymphs and adults at various rice stages.

Sweeping efficiencies for large nymphs and adults increased as rice grew older (see figure). The difference between these stages was negligible except at 11-12 WT.

Sweeping efficiency differed markedly among categories of adults (see table). Efficiency was highest for GLH parasitized by pipunculids, suggesting that their position in rice plants is, on the average, higher than that of healthy adults.

Females were less efficiently collected than males. Among females, sweeping efficiency was consistently lower for those with mature ovaries than for those with immature ovaries; nevertheless, the difference was slight.

These results indicate that sweeping samples give overestimates for population parameters such as pipunculid parasitism, sex ratio (male proportion), percentage of immature females, and population growth rate per generation. □