

Suitability of ricefield plants to planthopper *Nisia carolinensis* Fennah

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Nisia carolinensis (= *atrovenosa* Lethierry), a meenoplid planthopper common in ricefield habitats, is recorded as a minor pest of rice. We studied its ovipositional preference, survival, and developmental biology on rice and 58 ricefield plants common in the Philippines that comprise 16 botanical families: Poaceae (26), Cyperaceae (7), Asteraceae (5), Commelinaceae (3), Fabaceae (3), Amaranthaceae (2), Convolvulaceae (2), Rubiaceae (2), and one each of Aizoaceae, Capparaceae, Euphorbiaceae, Onagraceae, Pontederiaceae, Portulacaceae, Scrophulariaceae, and Sphenocleaceae.

Individual plants in the vegetative stage, collected from the IRRI farm, were potted and enclosed in 10- × 72-cm cylinder mylar film cages with top and side mesh vents pushed into the soil. A mating pair of adult hoppers from a stock culture on purple nutsedge *Cyperus rotundus* L. was allowed to oviposit and its progeny developed on each potential host (10 pairs per plant species) in the greenhouse. Host suitability was based on the following parameters: egg production per female, egg survival (the number of eggs developing to first instar divided by the total number of eggs laid multiplied by 100), nymphal survival (the number of first instar developing to last instar divided by the total number of first instar multiplied by 100), and nymph development time.

After five days, *N. carolinensis* females oviposited on only 16 plants from six families: Poaceae (6), Cyperaceae (5), Asteraceae (2), and one each on Commelinaceae, Euphorbiaceae, and Fabaceae. The best ovipositional hosts (no. eggs/female) were *C. rotundus* L. (44.4) and *C. difformis* L. (28.1) (Table 1). Seven or less eggs per female were laid on the 14 other ricefield plants: *Cyperus iria* L. (7.0), *C. brevifolius*

Table 1. Host plant range of *N. carolinensis* in a greenhouse.^a IRRI, 1990-93.

Host	Eggs laid (no./female)	Egg survival (%)	Nymphal survival (%)	Nymph developmental period (d) ^b	Fecundity of surviving females (no. eggs laid) ^c
Cyperaceae					
<i>Cyperus rotundus</i>	44.4 ± 4.7 a	96.2 ± 4.2 a	83.6 ± 6.8 a	17.0 ± 0.8 a	52.1 ± 3.7 a
<i>C. difformis</i>	28.1 ± 5.6 b	91.5 ± 9.8 b	77.6 ± 10.1 b	17.2 ± 1.5 b	30.0 ± 4.4 b
CV (%)	13.30	4.30	5.73	2.09	5.71
LSD (0.05)	0.13	0.16	0.18	0.02	0.04

^a Values are means ± standard errors at 95% confidence level. Av of 10 replications. In a column, means followed by a common letter are not significantly different ($P < 0.05$) by LSD statistical test. Nonhosts: Aizoaceae — *Trianthema portulacastrum* L.; Amaranthaceae — *Alternanthera sessilis* (L.) R. Br. ex roem. & Schult.; *Amaranthus spinosus* L.; Asteraceae — *Ageratum conyzoides* L., *Eclipta prostrata* (L.) L., *Tridax procumbens* L.; Capparaceae — *Cleome rutidosperma* DC.; Commelinaceae — *Commelina benghalensis* L., *C. diffusa* Burm. f.; Convolvulaceae — *Ipomoea aquatica* Forssk., *I. triloba* L.; Cyperaceae — *F. miliacea* (L.) Vahl; Fabaceae — *Mimosa pudica* L., *Sesbania sesban* (L.) Merr.; Onagraceae — *Ludwigia octovalvis* (Jacq.) Raven; Poaceae — *Brachiaria distachya* (L.) Stapf, *B. mutica* (Forssk.) Stapf, *Chloris barbata* Sw., *Cynodon dactylon* (L.) Pers., *Dactyloctenium aegyptium* (L.) Willd., *Digitaria ciliaris* (Retz.) Koel., *D. setigera* Roth ex Roem. & Schult., *Echinochloa colona* (L.) Link., *E. crus-galli* (L.) P. Beauv. ssp. *hispidula* (Retz.) Honda, *E. glabrescens* Munro ex Hook f., *Eriochloa procerata* (Retz.) C. E. Hubb., *Leersia hexandra* Sw., *Leptochloa chinensis* (L.) Nees, *Oryza sativa* L., *Panicum maximum* Jacq., *P. repens* L., *Paspalum distichum* L., *P. scrobiculatum* L., *Zea mays* L.; Pontederiaceae — *Portulaca oleracea* L.; Rubiaceae — *Borreria ocyroides* (Burm. f.) DC., *Hedyotis racemosa* Lam.; Scrophulariaceae — *Lindernia anagallis* (Burm. f.) Pennell; and Sphenocleaceae — *Sphenoclea zeylanica* Gaertn. ^b n = 10. ^c n = 10.

Table 2. Life history of *N. carolinensis* on *C. rotundus* in a greenhouse. IRRI, 1993.

	$\bar{x} \pm sd$
Egg incubation period (d)	5.4 ± 0.5
Nymphal stadium (d)	
I	3.4 ± 0.5
II	3.5 ± 0.6
III	3.3 ± 0.5
IV	3.1 ± 0.5
V	3.7 ± 0.9
Egg-nymph development period (d)	22.4 ± 3.4
Adult longevity (d)	
Male	9.4 ± 1.3
Female	12.1 ± 2.0

(Rottb.) Hassk. (6.9), *C. kyllingia* Endl. (1.2) (Cyperaceae); *Vernonia cenerea* (L.) Less. (3.2), *Synedrella nodiflora* (L.) Gaertn. (1.4), (Asteraceae); *Chrysopogon aciculatus* (Retz.) Trin (2.5), *Eleusine indica* (L.) Gaertn. (2.4), *Paspalum conjugatum* Berg. (0.8), *Ischaemum rugosum* Salisb. (0.8), *Rottboellia cochinchinensis* (Lour.) W.D. (0.5), *Imperata cylindrica* (L.) Raeuschel (0.3) (Poaceae); *Murdannia nudiflora* (L.) Brenan (0.7) (Comelinaceae); *Euphorbia hirta* L. (1.4) (Euphorbiaceae); and *Calopogonium mucunoides* Desv. (1.2) (Fabaceae).

Among the 16 ovipositional hosts, only two Cyperaceae species allowed egg and nymphal survival: *C. rotundus* (96.2% and 83.6%) and *C. difformis* (91.5% and 77.6%) (Table 1). Nymph development time was similar between *C. rotundus* (17.0 d) and *C. difformis* (17.2 d). Female fecundity reared on *C. rotundus* and *C. difformis* averaged 52.1 and 30.0 eggs each, respectively.

On *C. rotundus*, nymphs hatched after 5.4 d (Table 2). The planthopper passed through five nymphal stadia lasting 3-4 d each. The developmental period from oviposition to last nymphal stadium average 22.4 d. Adult females usually emerged ahead of the males, and females lived longer (12.1 d) than males (9.4).

The only hosts of *N. carolinensis* were sedges, thus we could not confirm reports that rice was a host of this ricefield planthopper. ■

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