Effect of geomorphic field position, flooding, and cropping pattern on plant parasitic nematodes of crops following rainfed wetland rice in Iloilo, Philippines

M. B. Castillo, associate professor, and M. B. Arceo, research assistant, Department of Plant Pathology, College of Agriculture, University of the Philippines at Los Baños; and J. A. Litsinger, associate entomologist, Cropping Systems Program, International Rice Research Institute

Geomorphic field position along a toposequence – knoll or summit, side slope, plateau, plain, river levee, and bottomland or drainageway – is an important determinant of cropping intensity in rainfed wetland rice environments. Landforms within a similar rainfall pattern differ in the ability to accumulate and retain water. Earlier studies showed that flooding during rice culture suppresses plant parasitic nematode populations that attack the roots of field legumes planted after rice.

The degree to which nematodes are controlled by flooding conditions and cropping pattern in given geomorphic field positions was investigated. Nematode populations in soil and root samples of legumes or other susceptible crops planted after single-, double- or triple-cropped rice (including a ratoon) were determined. The fields sampled had had similar cropping patterns in 3 successive years; however, a second full crop of rice was introduced only in 1977 in Iloilo. Fields within landforms were grouped according to degree of flooding (unflooded, one full crop flooded, and two full crops flooded per year). The ratoon crop is normally not flooded.

The unflooded knolls, as expected, provided conditions suitable for sustaining populations of nematodes *(Rotylenchulus* and *Meloidogyne)* (see table). In addition, light-textured, well-drained river levees harbored high nematode populations even when one crop of flooded rice had previously been grown.

All other landforms involving at least one flooded rice crop were unsuitable to *Rotylenchulus* and *Meloidogyne* populations, regardless of the cropping pattern. Bottomlands, the most water-enriched of all landforms, showed the least nematodes.

Flooding during wetland rice culture is an effective cultural control of plant parasitic nematodes on crops following rice in all landforms except river levees.

Effect of geomorphic field position, flooding, and cropping pattern on plant parasitic nematodes in Iloilo, Philippines, 1977.

Fields sampled[a] (no.)	Cropping pattern[b]	Geomorphic position	Nematodes[c] (mean no./300 cc soil + 1 g roots) *Meloidogyne*	*Rotylenchulus*	Total of 9 genera[d]
		Unflooded fields			
3	Corn-S	River levee	1427 a	1219 a	2711 a
4	S-S	Knoll	41 b	587 b	650 b
		1 crop flooded/year			
4	Rice-S	River levee	108 b	28 bc	200 bc
4		Plateau	1 c	2 c	89 d
4		Slope	9 c	2 c	45 d
4		Plain	0 c	1 c	24 de
4		Bottomland	1 c	1 c	7 e
4	Rice-ratoon-S	Plateau	0 c	9 c	31 d
4		Slope	1 c	4 c	95 d
4		Plain	32 c	12 c	128 d
4		Bottomland	0 c	1 c	22 de
		2 crops flooded/year			
4	Rice-rice-S	Plateau	0 c	1 c	36 d
4		Slope	0 c	1 c	15 de
4		Plain	0 c	1 c	23 de
4		Bottomland	0 c	0 c	5 e
4	Rice-rice-ratoon-S	Bottomland	0 c	0 c	24 e

[a] During the flowering stage of the nematode-susceptible crop.
[b] S = nematode-susceptible crop (Leguminosae, Cucurbitaceae, Malvaceae, Solanaceae).
[c] Soil and roots from 5 locations per field were pooled. Nematodes were extracted from 5 samples of pooled soil by the sieving-Baermann funnel technique and roots were stained in acid fuchsin-lactophenol. In a column any 2 means followed by a common letter are not significantly different from each other at the 5% level.
[d] *Helicotylenchus, Hemicriconemoides, Hemicycliophora, Hoplolaimus, Pratylenchus, Scutellonema,* and *Tylenchorhynchus.*

Alternate crops for rice fallow

M. A. Singlachar, rice agronomist, and B. Jagannath, farm superintendent, University of Agricultural Sciences, Regional Research Station, Mandya, Karnataka 571405, India

In screening of alternate crops for rice fallow, four grain legumes – field bean, cowpea, green gram *Phaseolus radiatus,* and black gram *Phaseolus mungo* – were sown in rice fallow after one plowing and harrowing. Each crop was replicated twice. Fertilizer nitrogen and phosphate were applied at 25 kg/ha and 50 kg/ha, respectively. The field was irrigated once at sowing and twice thereafter. The crops were hand weeded once.

Table 1. Comparative performance of grain legumes planted in rice fallow, Mandya, Karnataka, summer 1976.

Crop	Variety	Yield[a] (t/ha)	Duration (days)
Field bean	Avare 4	0.2[b]	110
Cowpea	C-152	1.5	100
Green gram	Jawahar 45	0.7	90
Black gram	Khoragoan 3	1.0	95

[a] Mean of 2 replications.
[b] Severe pest incidence.

Table 2. Data on ancillary characters of grain legumes planted in rice fallow. Mandya, Karnataka, India, summer 1976.

Crop	Plant spread (cm)	Branches (no./plant)	Pods (no./plant)	Pod length (cm)	Seeds (no./pod)	Plant ht (cm)	1,000-grain wt (g)
Field bean	33.4	7.5	20.4	5.7	3.5	50.8	–
Cowpea	49.5	5.5	14.8	14.0	13.7	47.6	105.2
Green gram	35.6	6.4	23.3	7.0	11.1	36.0	37.4
Black gram	38.4	3.3	30.6	5.5	7.3	37.2	59.6

The comparative performance of the four legumes is shown in Tables 1 and 2. Cowpea (C-152) and black gram (Khoragoan-3) produced good yields. Severe borer infestation drastically reduced the field bean yield despite three sprays of dimethoate and one of Metacid.

In addition to yield advantage (1.5 t/ha), cowpea also had the maximum plant spread (Table 2). The greater canopy cover may enhance moisture conservation and utilization, and suppress weeds as well. ₩

The International Rice Research Newsletter (IRRN) invites all scientists to contribute concise summaries of significant rice research for publication. Contributions should be limited to one or two paragraphs and a table, figure, or photograph. They are subject to editing and abridgement to meet space limitations. Authors will be identified by name, title, and research organization.

Announcement

New Publication: *Rice Abstracts*

The Commonwealth Agricultural Bureaux (CAB) recently began publication of a new abstract journal, *Rice Abstracts*. CAB hopes that *Rice Abstracts* will become an essential source of information for all who wish to stay abreast of research on rice. The new publication is a further addition to the new series of specialized journals covering narrower subject areas than the better-known main abstract journals published by CAB. The new journals (such as *Seed Abstracts, Soyabean Abstracts,* and *Crop Physiology Abstracts)* bring together under one cover abstracts relevant to particular crops or subject areas, that have been published in all the main abstract journals.

Rice Abstracts is issued monthly in collaboration with the International Food Information Service. As with other CAB abstract journals, the emphasis is on coverage of the world research literature, including breeding, agronomy, fertilization, weed control, insects, diseases, physiology, biochemistry, environmental factors, storage, food science and technology, nutrition, economics, and related aspects. *Rice Abstracts* is expected to contain around 2,000 abstracts/year, with author indexes. Subject indexes may be added later.

The new journal is edited by Mr. J. Armstrong of the Commonwealth Bureau of Pastures and Field Crops (address: Hurley, Maidenhead, Berks SL6 5LR, UK). He would be pleased to deal with any technical inquiries and to receive copies of any published research material on rice, especially research reports, monographs, conference papers, reviews, etc. not published in the more usual scientific journals. Suggestions from readers regarding the content and layout of *Rice Abstracts* would be appreciated.

Specimen copies of *Rice Abstracts,* subscription rates (including details of a special introductory offer to new subscribers), and information on other CAB services are available from: The Editorial Director, Commonwealth Agricultural Bureaux, Farnham Royal, Slough, SL2 3BN, UK. ₩

The International Rice Research Institute
P.O. Box 933, Manila, Philippines

Stamp