

EFFECTS OF ECONOMIC AND POLICY CHANGES ON STATUS OF NEMATODE RICE PESTS IN VIETNAM AND THE PHILIPPINES <sup>(1)</sup>

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For centuries, Asian rice farmers have progressively improved their varieties and cultivation techniques. This slow process has resulted in almost stable and sustainable cropping systems. Nematode populations, likewise, have followed the same progressive evolution and specific rice-parasitic nematodes are found associated with different traditional rice cropping systems. In the Philippines and Vietnam, *Hirschmanniella* spp. are mostly associated with flooded rice; *Pratylenchus* spp. and *Meloidogyne* spp. damage rainfed rice but not irrigated rice; and *Ditylenchus angustus* mostly occurs in deepwater and floating rice. In the sixties, the pressure imposed by the growing demand for rice has led to the development and adoption of high yielding cultivars and to technological improvements that triggered cropping intensification in irrigated rice. However, these changes have not modified the pest status of the different rice-parasitic nematodes because they have not drastically changed the traditional rice cropping systems. More drastic changes in rice production are presently occurring in developing Southeast Asian countries. These changes include modifications of the cropping systems that may influence the behavior of nematode rice pests and thereby affect their relative economic importance. Because rice is the staple food and because it plays a unique role in the social life of most Asian countries, adoption of new rice technologies are mostly promoted by economic concerns and governmental policies.

***Ditylenchus angustus* in the Mekong delta of Vietnam**

In Vietnam, the Mekong Delta covers about 4 million ha. The major crop is rice, grown on 1 826 535 ha or 46 % of the total cropped area. Almost 50 % of the total Vietnam rice production and approximately 85 % of its exports come from the Mekong Delta (Anon., 1992). There are three major rice cropping seasons, the rainy

season from May to November, the winter/spring (W/S) crop from December to February, and the summer/autumn (S/A) crop from April to July (Catling, 1992). During the rainy season, rice is cultivated under four different water regimes: irrigated, rainfed, deepwater (50-80 cm), and very deep water (> 80 cm). Modern cultivars are grown under irrigated, rainfed conditions, and even in deepwater ecosystems in areas where the period of flooding does not exceed one month. Traditional, low-yielding floating, rice varieties are grown in very deep water areas. During the W/S and S/A crops, modern cultivars are grown under irrigated conditions.

The major plant parasitic nematodes associated with rice in the Mekong Delta are *Ditylenchus angustus* (Cuc & Kinh, 1981), *Hirschmanniella oryzae*, *H. mucronata*, and *Meloidogyne graminicola* (Cuc & Prot, 1992). *D. angustus* is prevalent in floating rice grown in 80 cm to 3 m of water during the flood period that occurs from August to November. *D. angustus* causes obvious symptoms and can totally destroy the crop in infested fields. Because of its widespread occurrence in the Mekong Delta (Catling & Puckridge, 1984), it was then considered a major rice parasitic nematode. But surveys conducted over the last 4 years (1989-1992) have indicated that *D. angustus* occurrence and damage have been tremendously reduced (Table 1). What could have caused this present decline in importance of *D. angustus* in the Mekong Delta?

In 1976, approximately 1.4 million ha of rice were grown during the rainy season. In 1990, this area was reduced to 913 770 ha. At the time, areas planted to rice during the W/S and the S/A seasons increased by 527 000 and 435 600 ha, respectively (Mekong Delta Master Plan, unpublished). The reduction in rice area during the rainy season has come mainly from areas under floating rice. Before world war II, floating rice was grown on 570 000 ha in the delta. This area has been reduced to 455 000 ha in 1980, to 300 000 ha in 1985,

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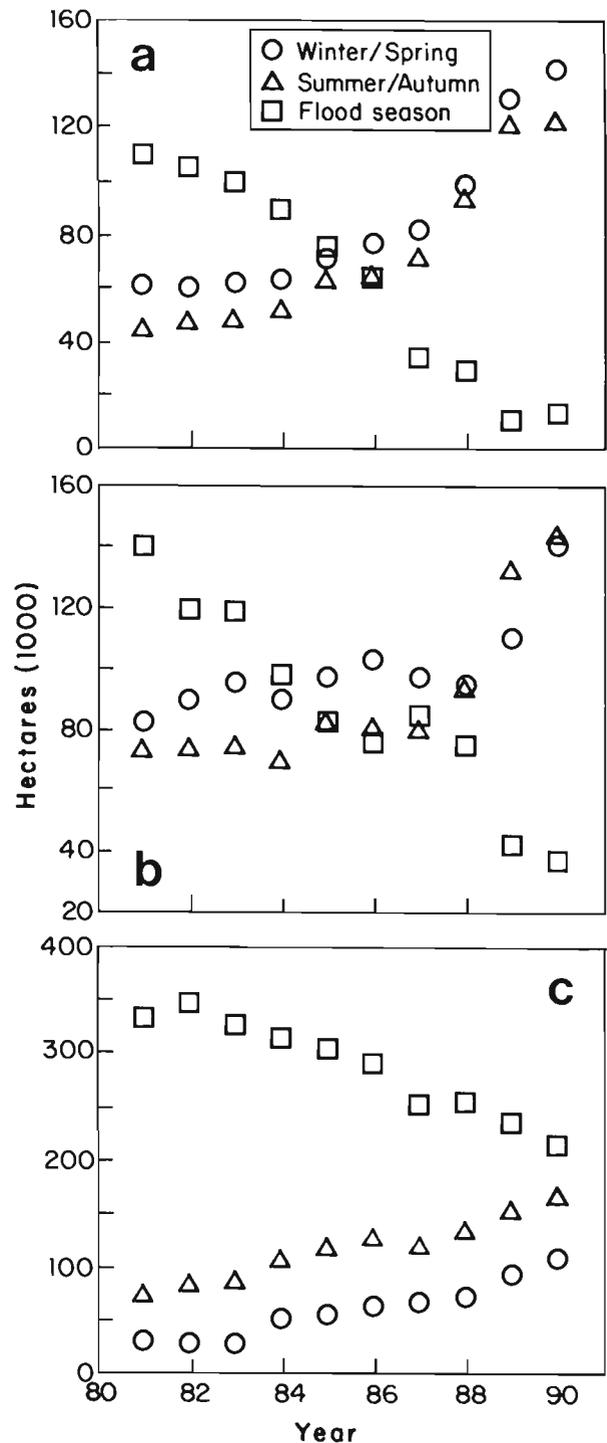
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**Table 1.** Estimated areas damaged by *Ditylenchus angustus* in three provinces of the Mekong Delta, Vietnam (Cuc & Prot, 1992).

Year	Damaged area (ha)	
	Dong Thap	
1976		60 000
1981		10 000
1990		20
	An Giang	
1976		2500
1980		210
1985		5
1990		0
	Hau Giang	
1982		17 900
1985		3700
1988		1284
1990		804

and to 70 000 ha in 1990 (Anon., 1992). This change was particularly evident in Dong Thap, An Giang, and Hau Giang provinces (Fig. 1) where floating rice was extensively cropped and where *D. angustus* was considered a major pest. Large areas of the delta are still flooded for 3-5 months every year but many farmers maintain their fields fallow during the flood period to grow one or two irrigated crops during the W/S and (or) S/A cropping seasons. *D. angustus* is still present in these areas, surviving on wild rice and weeds during the flood season. Cultivars grown during the W/S and S/A cropping seasons are susceptible to the nematode but damage is observed on very few plants. Because of its low incidence, the ufra disease does not cause significant damage. Apparently, the climatic conditions and/or the water regime that prevail during the W/S and S/A seasons do not favor the development and spread of the nematode.

Three major factors were responsible for the reduction of area planted to floating rice : the development of irrigation, the adoption of modern cultivars; and a change in policy. The development of irrigation canals and the introduction of high-yielding, photoperiod-insensitive, short-duration modern cultivars have increased the area where irrigated rice can be grown during the W/S and S/A cropping seasons. Irrigation technology and new cultivars were available before 1985 but 300 000 ha of floating rice were still grown in the delta. *D. angustus* has remained an important pest. In 1986, the Vietnamese government issued a decree (Contract Instruction number 10) that allowed farmers to lease the land for 10-15 years and commercialize their production. Before this decree, farmers worked for cooperatives and sold their rice to the government at a very low price. Farmers had no incentive to increase production. This change in policy gave strong incentives



**Fig. 1.** Change from 1980 to 1990 in rice cultivated area during the winter/spring, summer/autumn, and flood seasons in three provinces of the Mekong Delta, Vietnam (A : Dong Thap; B : An Giang; C : Hau Giang).



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