SHORTER COMMUNICATIONS

COVER CROPS FOR NEMATODE CONTROL IN OLD BANANA LAND

In the majority of Queensland banana plantations soil fumigation is impracticable because of the nature of the terrain. Nematode control is based on using nematode-free planting material and fallowing infested ground for at least two years before replanting. In practice, stools are destroyed and the area reverts to volunteer weed growth; the effect on the nematode complex depends to a large extent on the composition of this vegetation. The effect might be controlled by establishing nematode-resistant cover crops to suppress volunteer weeds over relatively long periods. Resistance to root-knot nematodes (*Meloidogyne* species) and the burrowing nematode (*Radopholus similis* (Cobb)) is essential; resistance to spiral nematodes is desirable.

A trial was set out on old banana land at the Maroochy Horticultural Research Station to evaluate the effects of a number of cover crops on a complex containing *Meloidogyne javanica* (Treub), *R. similis* and a spiral nematode (*Helicotylenchus dihystera* (Cobb)).

Banana stools were removed from the trial site on November 18, 1960. A cover crop of pigeon pea (*Cajanus cajan* (L.) Millsp.) was grown from December 8, 1960 to September 14, 1961. The trial was planted on November 16, 1961.

The design was a randomized block, plot size 600 sq. ft., with four replicates of centro (*Centrosema pubescens* Benth.) (seeding rate 5 lb per ac); *Desmodium uncinatum* DC. (4 lb per ac); glycine (*Glycine javanica* Benth.) (4 lb per ac); green panic (*Panicum maximum* var. *trichoglume* (K. Schum.) Eyles) (5 lb per ac); guar bean (*Cyamopsis tetragonoloba* Taub.) (4 lb per ac); Japanese millet (*Echinochloa crus-galli* var. *frumentacea* (Roxb.) Wight) (20 lb per ac); *Lotononis bainesii* Baker (2 lb per ac); maize (*Zea mays* L.) (56 lb per ac); molasses grass (*Melinis minutiflora* Beauv.) (4 lb per ac); siratro (*Phaseolus atropurpureus* DC.) (4 lb per ac); soybean (*Glycine max* (L.) Merr.) (35 lb per ac); stylo (*Stylosanthes gracilis* H.B.K.) (4 lb per ac); sweet sorghum var. Sugardrip (*Sorghum bicolor* (L.) Moench) (15 lb per ac); sweet Sudan grass (*Sorghum sudanese* (Piper) Stapf) (15 lb per ac); Townsville lucerne

(*Stylosanthes humilis* H.B.K.) (4 lb per ac); velvet bean (*Stizolobium* spp.) (60 lb per ac); and white panicum (*Echinochloa crus-galli* var. *frumentacea* (Roxb.) Wight) (20 lb per ac).

A soil sample from each plot consisted of 10 random subsamples taken with a 1-in. dia. sampling tube which removed a core of soil 6-8 in. deep. Nematodes were extracted by the Ehrlenmeyer method of Seinhorst (1956).

Estimates of the numbers of *Meloidogyne* larvae and of all stages of *R. similis* in 20 random samples taken over the whole area prior to planting are given in Table 1.

TABLE 1

ESTIMATES OF ROOT-KNOT AND BURROWING NEMATODES AT PLANTING TIME

Species	No. of Samples Infested (20 Samples Taken)	No. (range) in 400 ml Soil
Meloidogyne species	10	10–86 (larvae)
Radopholus similis	3	7–10 (all stages)

Centro, *Desmodium uncinatum,* glycine, guar bean, *Lotononis bainesii,* stylo and Townsville lucerne could not compete with the volunteer vegetation, which consisted mainly of crowsfoot grass (*Eleusine indica* (L.) Gaertn.) and were not sampled for nematode populations.

Periodic counts of *Meloidogyne* larvae and all stages of *H. dihystera* and *R. similis* in soil were taken some 7 to 32 weeks after planting and are recorded in Tables 2-4. Molasses grass did not become dominant until the autumn and samples were not taken prior to May 29.

TABLE 2

Meloidogyne LARVAE IN SOIL SAMPLES TAKEN FROM 7 TO 32 WEEKS AFTER PLANTING

Cover Crop	Larvae per 400 ml Soil					
	8.i.62	31.i.62	19.ii.62	29.iii.62	29.v.62	28.vi.62
Green panic	2	0	4	0	9	8
Japanese millet	64	36	*			
Maize	2	3	10	2	*	
Molasses grass	—	—	—	—	7	12
Siratro	1	4	7	10	0	5
Soybean	17	2	42	299	*	
Sweet sorghum	0	54	68	158	*	
Sweet Sudan grass ..	2	12	23	3	*	
Velvet bean	2	6	9	8	0	*
White panicum	28	35	69	83	*	

TABLE 3

Helicotylenchus dihystera IN SOIL SAMPLES TAKEN FROM 7 TO 32 WEEKS AFTER PLANTING

Cover Crop	Females and Larvae per 400 ml Soil					
	8.i.62	31.i.62	19.ii.62	29.iii.62	29.v.62	28.vi.62
Green panic	166	325	286	358	76	105
Japanese millet	555	1,189	*			
Maize	191	782	779	890	*	
Molasses grass	—	—	—	—	444	442
Siratro	185	1,046	1,009	1,742	587	1,620
Soybean	577	1,469	1,874	2,539	*	
Sweet sorghum	136	824	682	568	*	
Sweet Sudan grass ..	124	453	734	660	*	
Velvet bean	255	1,074	1,457	1,916	1,867	*
White panicum	634	1,558	1,425	2,050	*	

TABLE 4

Radopholus similis IN SOIL SAMPLES TAKEN FROM 10 TO 32 WEEKS AFTER PLANTING

Cover Crop	Females, Males and Larvae per 400 ml Soil				
	31.i.62	19.ii.62	29.iii.62	29.v.62	28.vi.62
Green panic	0	1	2	0	0
Japanese millet	0	*			
Maize	3	0	12	*	
Molasses grass	—	—	—	0	0
Siratro	0	4	0	2	0
Soybean	13	7	24	*	
Sweet sorghum	0	0	4	*	
Sweet Sudan grass ..	0	0	0	*	
Velvet bean	5	9	19	22	*
White panicum	3	0	0	*	

* Crop had died off before sampling date.

On March 8, 1962, 16 weeks after planting, a sample of roots from each plot was stained in acid fuchsin lactophenol and examined for nematodes. Egg masses of *M. javanica* were found attached to roots of centro, *Desmodium uncinatum,* guar bean, Japanese millet, molasses grass, sweet sorghum, soybean, sweet Sudan grass and Townsville lucerne; and *R. similis* in roots of *Desmodium uncinatum,* maize, sweet Sudan grass, Townsville lucerne and velvet bean. Japanese millet, soybean, sweet sorghum and white panicum were good hosts for *M. javanica* (see Table 2) and do not warrant further consideration. The value of maize as a cover crop on land infested with *M. javanica* is limited by its relatively short growing period.

The presence of *R. similis* in soil from velvet bean plots (Table 4) at each sampling points to the role of this legume as an alternative host.

Results of this study indicate that green panic most closely fulfils the requirements of an intercycle cover crop on banana land infested with *M. javanica, R. similis* and *H. dihystera.* In commercial practice the legume siratro, which is resistant to *M. javanica* and *R. similis,* is being grown with green panic. This combination is proving satisfactory.

REFERENCES

SEINHORST, J. W. (1956).—Een eenvoudige methode voor het afscheiden van aaltjes uit grond. *Tijdschr. Plzlekt.* 61:188-90.

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(Received for publication April 6, 1964)