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Distribution of Plant-Parasitic Nematodes on Sugarcane in Louisiana and Efficacy of Nematicides[1]

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Abstract: A survey conducted from May 1995 through August 1998 revealed diverse nematode communities in Louisiana sugarcane fields. High populations of *Mesocriconema, Paratrichodorus, Pratylenchus,* and *Tylenchorhynchus* were widespread in nine sugarcane production parishes. Comparisons of plant cane and ratoon sugarcane crops indicated that nematode community levels increase significantly in successive ratoon crops. Nematicide trials evaluated the efficacy of aldicarb, ethoprop, and phorate against indigenous nematode populations. Aldicarb consistently increased the number of millable stalks, cane tonnage, and yield of sucrose in soils with a high sand content. Yield increases were concomitant with reductions in the density of the nematode community shortly after planting and at harvest. In soils with a higher clay content, the chemicals were less effective in controlling nematode populations and, as a result, yield increases were minimal.

Key words: aldicarb, chemical control, distribution, ethoprop, frequency, *Helicotylenchus* spp., lesion nematode, *Mesocriconema* spp., nematode, nematode management, *Paratrichodorus* spp., *Pratylenchus* spp., ring nematode, *Saccharum officinarum,* spiral nematode, stubby-root nematode, stunt nematode, sugarcane, *Tylenchorhynchus* spp.

Sugarcane, interspecific hybrids of *Saccharum* L., is a major agricultural crop that is produced worldwide in tropical and subtropical climates. In Louisiana, more than 170,000 ha in 23 parishes are cropped to sugarcane each year. In 1998, sugarcane was the most valuable row crop in the state, with an estimated value of $500 million (Anonymous, 1998).

Sugarcane crops are planted in August and September by vegetative propagation. Initial shoot growth is terminated by winter conditions. Growth resumes in the spring, and the crop is harvested in November and December. From initial plantings, two or three ratoon crops may be obtained in successive years. A disease complex, known as stubble decline, is responsible for reductions in the ratooning ability of the crop (Edgerton et al., 1934; Edgerton, 1939). Major biotic and abiotic factors involved in this complex include winter stress, physiological status of the plant at harvest, cultivar genotype, weed competition, and diseases such as Pythium root rot (Edgerton et al., 1929), caused by *Pythium arrhenomanes* Drechs. (Rands and Dopp, 1938; Hoy and Schneider, 1988), and ratoon stunting disease, caused by *Clavibacter xyli* subsp. *xyli* (Davis et al., 1980). Recent evidence indicates that nematodes also play a role in this decline (Bond et al., unpubl.).

Numerous nematode genera have been shown to be pathogenic to sugarcane, with *Meloidogyne* and *Pratylenchus* being the most important worldwide (Birchfield, 1984; Spaull and Cadet, 1990). Many researchers have demonstrated that nematode communities in sugarcane fields generally are comprised of numerous endoparasitic and ectoparasitic species (Muir and Henderson, 1926; Fielding and Hollis, 1956; Spaull, 1981; Hall and Irey, 1990). Population dynamics studies have characterized nematode populations in sugarcane soil and have demonstrated that monoculturing of sugarcane can foster the accumulation of diverse nematode communities (Spaull and Cadet, 1990; Hall and Irey, 1990). Recent greenhouse and microplot studies have demonstrated that most sugarcane cultivars are susceptible to nematode communities found in sugarcane soil (Bond et al., 1997).

Management of plant-parasitic nematodes

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with nematicides is common in many sugarcane production areas of the world. In South Africa, nematicide applications in sandy soil provide significant increases in yield, which justify their use (Spaull et al., 1990; Spaull and Cadet, 1991). However, Spaull and Cadet (1990) state that nematodes reduce the yield of sugarcane across a variety of soil types and that more research is needed to evaluate nematicide efficacy in heavier soils. Currently, chemicals are not intentionally used for control of nematodes in sugarcane in Louisiana, although several pesticides used for insect control, such as carbofuran and phorate, have nematicidal activity.

The objectives of this work were to: (i) determine the frequency and distribution of nematode genera and species in sugarcane soils of Louisiana, (ii) compare nematode population densities in plant and ratoon sugarcane crops, and (iii) evaluate the efficacy of nematicides currently labeled for use on sugarcane.

Materials and Methods

Nematode survey: Sugarcane fields were sampled from May 1995 through August 1998. Nine parishes were selected to represent the sugarcane production region of Louisiana. All fields from which a sample was collected had a long history of sugarcane production. A total of 93 samples were collected representing 93 fields. Additional criteria for site selection included cultivar and crop cycle year. Each sample was a composite of 45 soil cores (2.5-cm-diam. × 30-cm-deep) collected from a 2.0-ha subsection of the field. Nematodes were extracted from 150 g of soil by wet-sieving through nested 250-µm-pore and 38-µm-pore sieves followed by sugar flotation and centrifugation (Jenkins, 1964). Root pieces collected on the 250-µm-pore sieve were placed on a Baermann funnel for extraction of endoparasitic nematodes.

Nematicide trials: Nematicide trials were conducted at two sites in 1995 and 1997. In 1995, sites in St. James and Ascension parishes were selected to represent light sandy and heavier clay loam soils, respectively. A site in St. James Parish with a sandy soil and a site in Iberville Parish with a heavy clay soil were used in 1997 for the nematicide studies. Trials were initiated each year in September and harvested 15 months later in December. At all sites, plots consisted of six 1.8-m-wide × 22.9-m-long rows. Chemical treatments were applied to each row, and data were collected from the center 15.2 m of each of the four center rows.

Treatments were arranged in a randomized complete-block design with five replications. Treatments consisted of the nematicides aldicarb applied at 4.21 kg a.i./ha and ethoprop applied at 4.71 kg a.i./ha, the insecticide phorate at 4.09 kg a.i./ha, and a nontreated control. Granular chemicals were applied at planting in a 18-cm band directly over the cane stalks in open rows. Tractor-mounted chisels covered the rows and incorporated the chemicals to a depth of 25 to 30 cm. Following chemical application, all trials were managed and harvested according to conventional sugarcane production methods. Cultivar LCP 82–89 was used in all trials except in the St. James Parish trial in 1997, where LCP 85–384 was used.

At harvest, the number of millable stalks was counted in each plot. Additionally, 15 stalks were harvested from each plot and weighed to estimate stalk weight. The stalk weight and the number of stalks were then used to estimate cane tonnage per hectare. The stalk bundles were transported to the Sucrose Lab at the Sugar Research Station of the Louisiana Agricultural Experiment Station to determine the percentage of sucrose per stalk, and the sucrose content and tonnage estimates were then used to calculate the yield of sucrose per hectare. To estimate nematode populations, a composite of 30 soil cores (2.5-cm-diam. × 30-cm-deep) was collected from each plot, and a 150-g subsample was processed as described for the field survey. In trials initiated in 1995, soil samples were collected 2 months after planting and again at harvest. In the 1997 trials, nematode populations were estimated only at 2 months after planting.

Data analysis: There were year-by-treatment and site-by-treatment interactions so data for each test and year are presented separately. Yield data and $\log_{10}(x + 1)$-transformed nematode count data were subjected to analysis of variance using the General Linear Models procedure of the Statistical Analysis System version 6.12 for Macintosh (SAS Institute Inc., Cary, NC). Means were separated with Duncan's Multiple-Range Test, and all differences noted are significant at $P \leq 0.05$.

Results

Nematode survey: Nematode species in six genera were found with varying frequencies in the nine parishes included in the survey (Fig. 1; Table 1). Across parishes, *Helicotylenchus* spp. were found in 32.3% of the samples and detection ranged from a low of 11% in St. John Parish to a high of 80% in Point Coupee Parish. Of the six genera, *Meloidogyne* spp. were detected with the least frequency, occurring in only four of the nine parishes. In samples collected, detection of *Meloidogyne* spp. varied from 7.7% in Ascension Parish to 40% in Point Coupee Parish. *Mesocriconema* spp. were detected with great frequency and occurred in 88.2% of the samples across all parishes. In 49.5% of the samples collected, *Paratrichodorus* spp. were detected. Among the nine parishes, detection ranged from 25% in Assumption Parish to 100% in Point Coupee Parish. *Pratylenchus* spp. were found in 79.5% of the samples collected in the survey. Samples from St. James Parish had the lowest incidence (50%), while 100% of the samples collected in St. Mary Parish and Terrebonne Parish contained *Pratylenchus* spp. In six of the nine parishes, *Tylenchorhynchus* spp. were present in 100% of the samples collected.

Across all four stages of the crop cycle, species in the genera *Mesocriconema* and

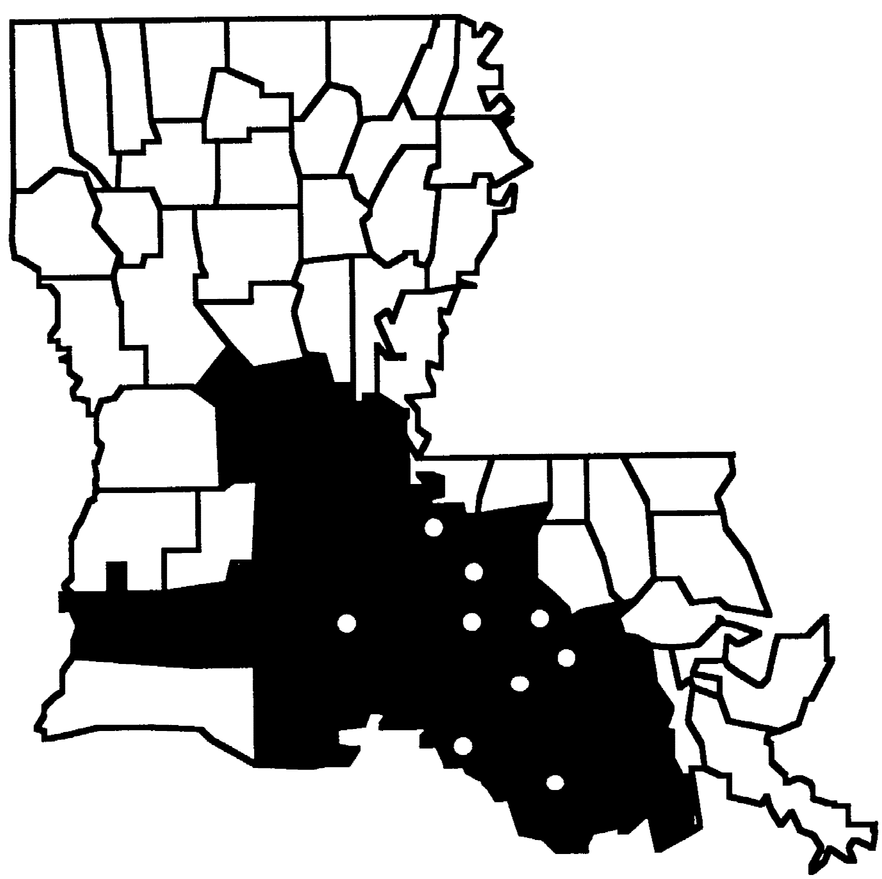

Fig. 1. Sugarcane production in Louisiana. Highlighted are the 23 Louisiana parishes that produce sugarcane. Parishes with a dot were included in the nematode survey during the period 1995–98.

TABLE 1. Incidence of plant-parasitic nematode genera found in sugarcane fields in Louisiana between May 1995 and August 1998.

	Fields infested (%)					
Parish[a]	*Helicotylenchus* spp.	*Meloidogyne* spp.	*Mesocriconema* spp.	*Paratrichodorus* spp.	*Pratylenchus* spp.	*Tylenchorhynchus* spp.
Ascension (13)	46.2	7.7	76.9	38.5	76.9	92.3
Assumption (16)	0.0	0.0	62.5	25.0	87.5	75.0
Iberville (12)	41.7	0.0	100.0	58.3	91.7	100.0
Point Coupee (5)	80.0	40.0	100.0	100.0	80.0	80.0
St. James (16)	12.5	12.5	100.0	68.8	50.0	100.0
St. John (9)	11.1	33.3	100.0	88.9	66.7	100.0
St. Mary (5)	0.0	0.0	100.0	0.0	100.0	100.0
Terrebone (5)	40.0	0.0	80.0	40.0	100.0	100.0
W. Baton Rouge (12)	41.7	0.0	91.7	33.3	83.3	100.0
Average (93)	32.3	8.6	88.2	49.5	79.5	93.5

[a] The number of fields sampled in each parish are in parentheses; 93 fields were sampled.

Tylenchorhynchus were most abundant (Table 2). Totals for *Mescriconema* spp. and all plant-parasitic species were greater in second and third ratoon crops compared with plant cane and first ratoon crops, and densities of *Tylenchorhynchus* spp. were higher in third ratoon than the plant cane crop.

Nematicide trials: In nematicide trials harvested in 1996, sugarcane yield was increased by the chemical treatments (Table 3). At the St. James site, the number of millable stalks was increased by all three chemicals. The magnitudes of the increase were similar for both aldicarb and phorate applications. The yield increase provided by aldicarb was greater than that for ethoprop. The only increase in cane tonnage at this site was the 15% observed for aldicarb. Aldicarb and ethoprop increased the yield of sucrose by 18% and 13%, respectively. At the Ascension site, yield increases due to chemical treatments were less pronounced. Aldicarb and phorate increased the number of millable stalks by 10% and 13%, respectively. All chemical treatments at this site tended to increase cane tonnage and yield of sucrose, but these increases were not significant.

Increases in sugarcane yield were concomitant with reductions in nematode populations (Table 4). Two months after planting at the St. James site, aldicarb reduced levels of *Tylenchorhynchus* spp., while both aldicarb and ethoprop reduced population levels of *Mesocriconema* spp. Aldicarb and ethoprop reduced the total of all plant-parasitic species by 36% and 32%, respectively. At harvest the total of all plant-parasitic species in nontreated controls was approximately three times greater than at 2 months after planting (Table 4). The effects of the nematicides on *Mesocriconema* spp. and *Tylenchorhynchus* spp. 2 months after planting were not apparent at harvest, approximately 1 year later. Reductions in *Paratrichodorus* spp. in aldicarb-treated plots were apparent at harvest, and aldicarb ef-

TABLE 2. Plant-parasitic nematodes found in plant and ratoon sugarcane crops in Louisiana between May 1995 and August 1998.

Crop cycle year[a]	*Helicotylenchus* spp.	*Mesocriconema* spp.	*Paratrichodorus* spp.	*Pratylenchus* spp.	*Tylenchorhynchus* spp.	Combined total
Plant cane	10 a	126 b	20 a	60 a	129 b	345 b
1st ratoon	17 a	208 b	19 a	44 a	153 bc	441 b
2nd ratoon	10 a	323 a	47 a	62 a	221 ab	663 a
3rd ratoon	15 a	414 a	36 a	52 a	249 a	766 a

[a] Ninety-three samples were collected from nine parishes, and data are means per 150 g of soil. Within each parameter, means followed by the same letter are not different ($P \leq 0.05$), according to Duncan's Multiple-Range Test.

TABLE 3. Sugarcane stalk population, tonnage, and sucrose yields as influenced by aldicarb, ethoprop, and phorate in St. James and Ascension Parishes, 1996.

	St. James[b]			Ascension[b]		
Treatment[a]	Millable stalks/ha	Cane (tons/ha)	Sucrose (kg/ha)	Millable stalks/ha	Cane (tons/ha)	Sucrose (kg/ha)
Control	94,738 c	111.0 b	11,114 c	83,603 b	81.3 a	8,662 a
Aldicarb	103,351 a	127.7 a	13,070 a	92,086 a	89.7 a	9,155 a
Ethoprop	100,115 b	118.1 b	12,571 ab	87,917 ab	87.9 a	9,227 a
Phorate	101,358 ab	116.4 b	12,011 bc	94,720 a	91.2 a	9,491 a

[a] Aldicarb, ethoprop, and phorate were applied at planting in a 18-cm band directly over stalks at rates of 4.21, 4.71, and 4.09 kg a.i./ha, respectively. Each chemical was incorporated with tractor-mounted chisels to a depth of 24 to 30 cm.
[b] Data are means of five replications. Within site and parameter, means followed by the same letter are not different ($P \leq 0.05$), according to Duncan's Multiple-Range Test.

fects on the density of all plant-parasitic species were still detectable 15 months after planting. The total number of plant-parasitic species in nontreated plots was 56% higher than those in plots treated with aldicarb.

Soil collected at the Ascension site did not contain *Meloidogyne* spp. (Table 4). In the heavier soil at this site, nematicides were not as effective in lowering nematode population densities. Population densities of *Mesocriconema* spp., *Pratylenchus* spp., and *Tylenchorhynchus* spp. in treated plots were not different from those of the controls. Only the application of aldicarb reduced the total of all plant-parasitic species 2 months after planting. At harvest, in the Ascension Parish test, population densities of *Mesocriconema* spp., *Pratylenchus* spp., and *Tylenchorhynchus* spp. in treated plots were not different from those in the control plots (Table 4). *Pratylenchus* spp. were detected, but their densities in treated and nontreated plots did not differ significantly.

In 1998, yield increases (Table 5) were similar to those observed in 1996 (Table 3). At the St. James site, aldicarb increased the number of millable stalks, cane tonnage, and the yield of sucrose by 13%, 15%, and 22%, respectively. In the heavier soil of Iberville Parish, yield increases were similar to those observed at the Ascension site in 1996, where only the number of millable stalks was increased. Both cane tonnage and yield of sucrose were unaffected by chemical treatments.

Increases in sugarcane yield at the St.

TABLE 4. Plant-parasitic nematode populations as influenced by aldicarb, ethoprop, or phorate at the St. James and Ascension sites 2 months after planting and at harvest.

	St. James		Ascension	
Treatment	6 Nov. 1995	9 Dec. 1996	10 Nov. 1995	12 Dec. 1996
	Meloidogyne spp.			
Control	8 a	118 a	0	0
Aldicarb	8 a	79 a	0	0
Ethoprop	10 a	96 a	0	0
Phorate	8 a	128 a	0	0
	Mesocriconema spp.			
Control	243 a	611 a	98 a	481 a
Aldicarb	166 b	381 a	76 a	434 a
Ethoprop	133 b	453 a	91 a	420 a
Phorate	187 ab	515 a	111 a	376 a
	Paratrichodorus spp.			
Control	28 a	258 a	22 a	62 a
Aldicarb	20 a	167 a	15 a	47 a
Ethoprop	26 a	210 a	17 a	81 a
Phorate	31 a	239 a	20 a	52 a
	Pratylenchus spp.			
Control	11 a	90 a	0	67 a
Aldicarb	15 a	62 a	0	81 a
Ethoprop	10 a	67 a	0	72 a
Phorate	15 a	81 a	0	82 a
	Tylenchorhynchus spp.			
Control	115 a	256 a	86 a	238 a
Aldicarb	52 b	165 a	52 a	143 a
Ethoprop	95 ab	271 a	76 a	281 a
Phorate	67 ab	253 a	51 a	305 a
	Total plant-parasitic species			
Control	405 a	1,333 a	206 a	848 a
Aldicarb	261 b	854 b	143 b	705 a
Ethoprop	274 b	1,097 ab	184 ab	854 a
Phorate	308 ab	1,216 ab	182 ab	815 a

[a] Aldicarb, ethoprop, and phorate were applied at planting in a 18-cm band directly over stalks at rates of 4.21, 4.71, and 4.09 kg a.i./ha, respectively. Each chemical was incorporated with tractor-mounted chisels to a depth of 24 to 30 cm.
[b] Data are means of five replications. Nematodes per 150 g of soil. Within each parameter, means followed by the same letter are not different ($P \leq 0.05$), according to Duncan's Multiple-Range Test.

TABLE 5. Sugarcane stalk population, tonnage, and sucrose yields as influenced by aldicarb, ethoprop, and phorate in St. James and Iberville Parishes, 1998.

	St. James[b]			Iberville[b]		
Treatment[a]	Millable stalks/ha	Cane (tons/ha)	Sucrose (kg/ha)	Millable stalks/ha	Cane (tons/ha)	Sucrose (kg/ha)
Control	117,822 b	130.2 b	13,562 b	74,796 ab	46.7 a	4,279 a
Aldicarb	133,111 a	149.3 a	16,568 a	79,227 a	48.4 a	4,286 a
Ethoprop	123,318 ab	139.6 ab	15,415 ab	73,205 ab	47.2 a	4,263 a
Phorate	124,630 ab	131.7 ab	15,297 ab	71,213 b	45.7 a	4,145 a

[a] Aldicarb, ethoprop, and phorate were applied at planting in a 18-cm band directly over stalks at rates of 4.21, 4.71, and 4.09 kg a.i./ha, respectively. Each chemical was incorporated with tractor-mounted chisels to a depth of 24 to 30 cm.
[b] Data are means of five replications. Within each site and parameter, means followed by the same letter are not different ($P \leq 0.05$), according to Duncan's Multiple-Range Test.

James site in 1998 were concomitant with reductions in nematode populations (Table 6). When compared to the nontreated control, population densities of *Tylenchorhynchus* spp. and the total of all plant-parasitic species were lowered in aldicarb-treated plots by 45% and 26%, respectively. At the Iberville site, the chemical treatments did not affect the population densities of *Mesocriconema* spp., *Pratylenchus* spp., or *Tylenchorhynchus* spp. (Table 6).

TABLE 6. Plant-parasitic nematode populations as influenced by aldicarb, ethoprop, or phorate at the St. James and Iberville sites 2 months after planting, 1997.

Treatment	St. James	Iberville
	Mesocriconema spp.	
Control	209 a	162 a
Aldicarb	185 a	133 a
Ethoprop	206 a	138 a
Phorate	221 a	156 a
	Paratrichodorus spp.	
Control	38 a	0
Aldicarb	24 a	0
Ethoprop	28 a	0
Phorate	30 a	0
	Pratylenchus spp.	
Control	0	57 a
Aldicarb	0	51 a
Ethoprop	0	59 a
Phorate	0	60 a
	Tylenchorhynchus spp.	
Control	136 a	108 a
Aldicarb	74 b	100 a
Ethoprop	92 ab	108 a
Phorate	118 ab	120 a
	Total plant-parasitic species	
Control	383 a	327 a
Aldicarb	283 b	284 a
Ethoprop	326 ab	305 a
Phorate	369 ab	336 a

[a] Aldicarb, ethoprop, and phorate were applied at planting in a 18-cm band directly over stalks at rates of 4.21, 4.71, and 4.09 kg a.i./ha, respectively. Each chemical was incorporated with tractor-mounted chisels to a depth of 24 to 30 cm.
[b] Data are means of five replications. Nematodes per 150 g of soil. Within each parameter, means followed by the same letter are not different ($P \leq 0.05$), according to Duncan's Multiple-Range Test.

DISCUSSION

Results from the survey demonstrate the diversity of nematode communities in the sugarcane soils of Louisiana. Samples were obtained from fields that differed with regard to cultivar and weed spectrum. Variation in the nematode species that were present was apparently most closely related to differences in soil types. *Meloidogyne* spp. (Williams, 1963; Hu and Chu, 1964; Roman, 1968) and *Paratrichodorus* spp. (Winfield and Cooke, 1975) occur most commonly in soils with a low clay content. In this survey, *Meloidogyne* spp. and *Paratrichodorus* spp. were found with the greatest frequency in samples collected from Point Coupee, St. James, and St. John parishes, where the majority of the samples had a high sand content. *Pratylenchus* spp. were found with the greatest frequency in heavy, muck soils (Hall and Irey, 1990). In this survey, the lowest detection of *Pratylenchus* spp. was in Point Coupee, St. James, and St. John parishes, and the highest detection was in St. Mary and Terrebonne parishes. Samples collected from St. Mary and Terrebonne parishes had a higher clay content than did all other samples. *Tylenchorhynchus* spp. and *Mesocriconema* spp. reproduce well across a variety of soil types (Hall and Irey, 1990). Across all parishes and soil types, species in these two genera were found with great frequency and at high population levels.

In Florida (Hall and Irey, 1990), nematode community levels were lower in younger plant cane crops than in ratoon crops, although in older plant cane, population densities were similar to those found in ratoon crops. Nematode populations were much greater in sugarcane that was planted immediately after the harvest of the final ratoon crop than where planting followed a fallow season. Monoculturing of sugarcane is known to lead to higher community densities in ratoon crops than in plant cane (Cadet and de Boer, 1990). In the present work, community densities were similar in the plant cane and first ratoon crops. However, both the second and third ratoon crops supported significantly higher community levels than either the plant cane or first ratoon crops.

In Louisiana, Birchfield (1969) was the first to report yield increases in sugarcane as a result of aldicarb and ethoprop applications. Application of nematicides at planting reduced nematode population densities and increased the yield of sucrose by 10–19%. Increases in sugarcane yield by aldicarb also have been demonstrated in other sugarcane-growing regions of the world. In Australia, Bull (1981) demonstrated that cane tonnage could be increased by 700% following aldicarb application. In South Africa, applying aldicarb at planting led to a 50% increase in cane tonnage (Donaldson, 1985). In the present trials, soil at both sites in St. James Parish consisted of a high sand content, and aldicarb application increased cane tonnage and yield of sucrose by 15% and 20%, respectively. Ethoprop increased the yield of sucrose in only the 1995 trial in St. James Parish.

Spaull and Cadet (1990) reported that yield increases as a result of aldicarb treatment were more variable in soils with a high clay content of 7–15%. Research recently conducted at the Sugar Research Station agree with this report. Aldicarb resulted in only slight increases in cane tonnage and no significant increases in the yield of sucrose (C. Overstreet, pers. comm.). Our results from the sites with the higher clay content are in agreement with these reports. At the Ascension site, the only parameter that was increased in aldicarb-treated plots was the number of millable stalks; at the Iberville site, sugarcane yield was not increased with aldicarb treatments.

The efficacy of nematicides as a management tool for nematodes in sugarcane production systems has been well documented. The suppression of nematode populations can last only a few months (Birchfield, 1969; Showler et al., 1991) or can persist until harvest (Chandler, 1980; Cadet, 1985). In the present trials, both types of suppression were observed. Nematode populations were lowered in the 1995 and 1997 trials in St. James Parish by the nematicides at 2 months after planting. In the 1995 trial, the suppression in nematode populations was still apparent at harvest, 15 months later. At the Ascension site in 1995, the nematode population density was suppressed in the aldicarb-treated plots 2 months after planting, but not at harvest. Two months after planting, in the 1997 trial in Iberville Parish, nematode populations were not measurably impacted by the chemical treatments, and variability in the yield response at these two sites to chemical treatments is apparently related to a lack of nematode control.

Increases in the yield of sucrose averaged 20% at the two sites in St. James Parish. The magnitude of this increase would justify the use of aldicarb when considering the cost of the chemical, application costs, and the current value of U.S. sugar. Assuming an average sucrose yield of 7,846 kg/ha, a producer who owns the production land could expect a net profit of $175.00/ha. If the production land is rented, the producer could expect a net profit of $102.50/ha (Anonymous, 1998). The increased nematicide efficacy in soils with a high sand content compared with soils with more clay is well documented (Donaldson, 1985; Spaull et al., 1990; Spaull and Cadet, 1990, 1991). Only 23% of the sugarcane acreage in Louisiana is planted in lighter soils where a yield increase could be expected.

Spaull and Cadet (1990) contend that

even if increases in plant cane yield are not detected, the plants will develop a more extensive root system, which can lead to yield increases in subsequent ratoon crops. Additionally, the number of ratoon crops might be increased by applying nematicides to lower nematode populations and resulting root damage. Currently, information on nematicide effects on ratoon crops is lacking in Louisiana, but, due to the expenses involved in replanting after the third ratoon crop, the addition of a ratoon crop in the crop cycle would be a substantial benefit to sugarcane producers. Research is needed to address the effect of nematicides on ratoon crops and the potential to increase the number of ratoon crops that can be grown.

Nematode-resistant or tolerant cultivars and crop rotations are not viable nematode management strategies for sugarcane production in Louisiana. Nematode-resistant cultivars are not available, and the value of rotational crops, such as soybean and cotton, does not justify their incorporation into the sugarcane production system. Based on these studies, aldicarb could be beneficial in sugarcane production on a limited basis in Louisiana. However, the majority of sugarcane is grown in soil with a high clay content. In these soils, a significant yield response to aldicarb treatment would not be expected. Currently, the best available nematode management strategy is to incorporate a fallow season into the crop cycle. This fallow season, which lasts about 7 months, is an important period in the producers' weed management program. However, these data indicate that while nematode numbers are significantly reduced following this fallow season, populations rebound and reach damaging levels shortly after planting. The nematode species common in sugarcane fields in Louisiana are not known to possess any resistant life stages. Apparently, nematodes survive the fallow period by feeding and reproducing on indigenous weed species. Therefore, a diligent weed management program is the only strategy available to eliminate this ''bridging'' mechanism.

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