

## Introduction

Increasing the cover crop options for annual hill production of organic strawberry (*Fragaria ×ananassa*) can increase cropping system diversity while providing agroecosystem services. In summer 2013, sunn hemp (*Crotalaria juncea*) and hairy indigo (*Indigofera hirsuta*) were the best performing of four leguminous cover crops. The cover crops had been selected for evaluation due to their potential for off-season suppression of weeds and plant-pathogenic nematodes and as a source of green manure. Stakeholder evaluation of the research yielded the following recommendations:

- More research with sunn hemp and hairy indigo.
- Evaluate cover crops that produce a marketable product and cover crop mixtures.

As a result, the **objectives** of the 2014 studies were to:

1. Further evaluate biomass production and weed suppression of sunn hemp and hairy indigo.
2. Compare the performance of sunn hemp and hairy indigo to sesame (*Sesamum indicum*) – a potential “cash” cover crop and a 4-way cover crop mixture.
3. Assess whether *Crotalaria* accessions and species of differing origins vary in susceptibility to *Belonolaimus longicaudatus* (sting nematode), a key pest of strawberry in Florida.

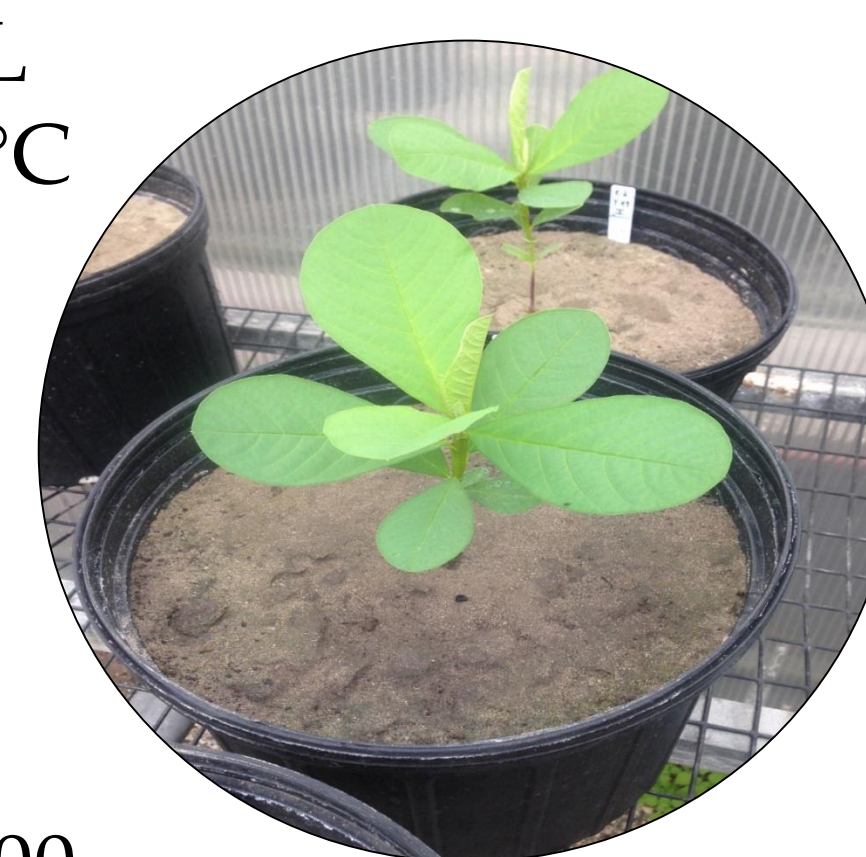
## Materials and Methods

**Table 1.** Species and seeding rates of cover crops used in monoculture and mixture prior to organic strawberry. Sunn hemp and hairy indigo were evaluated at 4 locations, and sesame and the 4-way mixture at only 1 of the 4 locations.

Cover Crop	Rate
Sunn hemp	40 lb/ac
Hairy indigo	20 lb/ac
4-way mixture	Sunn hemp, hairy indigo, short-flower rattlebox, American jointvetch (12 lb, 12 lb, 6 lb, and 6 lb/ac each)
Sesame	7 lb/ac
Weedy	No cover crop

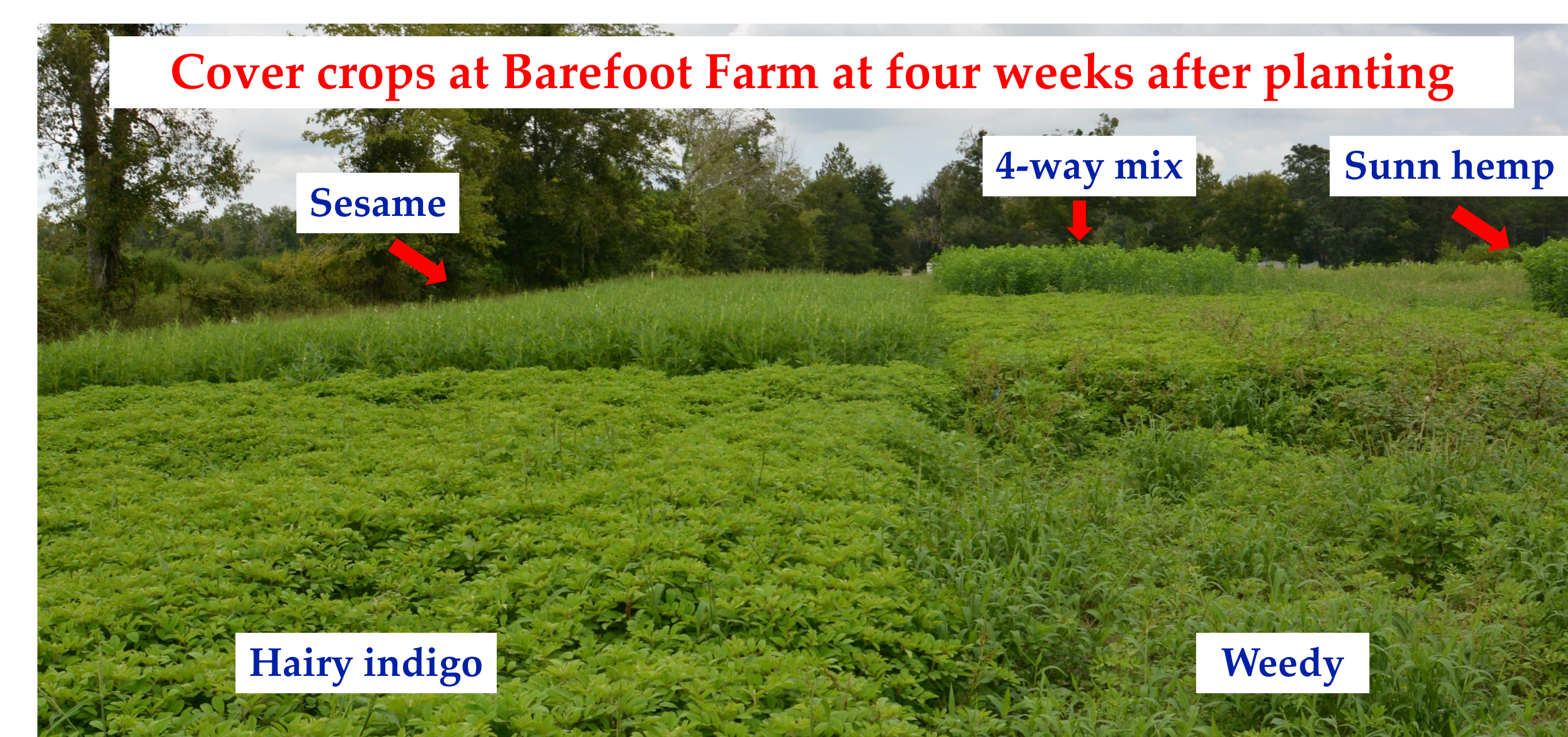
### Greenhouse Nematode Assay:

- Single *Crotalaria* plants were grown in 11.5-L pots in soil pasteurized with dry heat at 61 °C for one week.
- Inoculation with a 10-mL suspension containing 200 sting nematodes in 4 holes (1 cm x 2.5 cm) in the soil.
- Host status was determined at 60 days after inoculation by extracting nematodes from 100 cm<sup>3</sup> of soil from each pot.

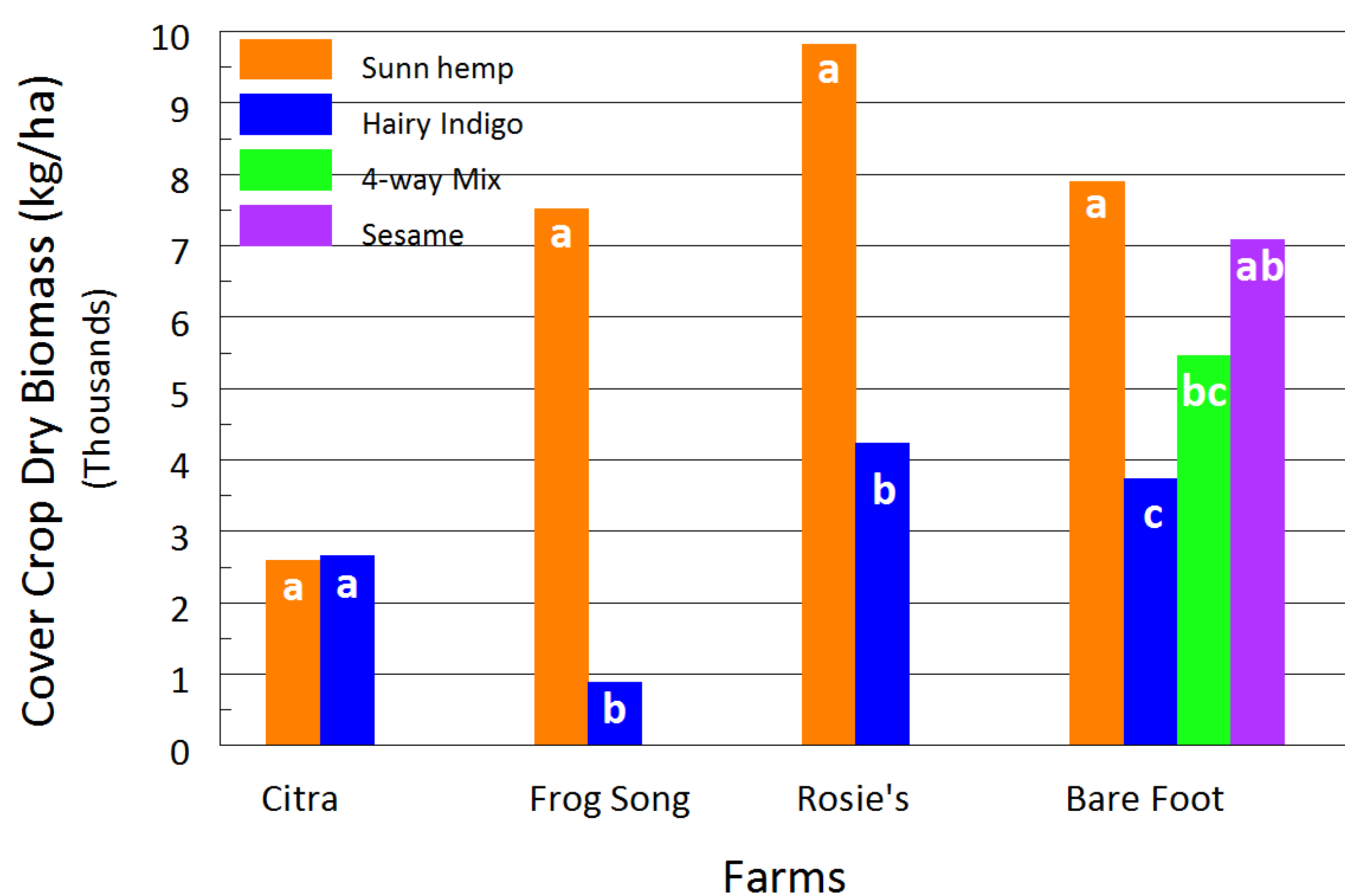


## Conclusions

- In 3 of 4 locations sunn hemp dry biomass exceeded 7000 kg/ha – only sesame had comparable biomass.
- Hairy indigo and sesame were as effective as sunn hemp at suppressing weed biomass.
- The 4-way mixture effectively suppressed weeds but 80% of the biomass consisted of sunn hemp.
- *Crotalaria* species vary in their susceptibility to sting nematode but ‘Tropic Sun’ sunn hemp is a nonhost.



## Results



**Fig. 1.** Cover crop biomass at 9 weeks after planting at the Plant Science Research and Education Unit (PSREU) in Citra, FL and at 3 farms in north-central Florida, 2014.

**Table 2.** Weed biomass in Citra and at two organic farms (Gainesville and Hawthorne, FL) in response to sunn hemp and hairy indigo cover crops at 9 weeks after planting.

Farm	Cover Crop	Broadleaf	Grasses	Sedges	Total
		(kg/ha)			
Citra (PSREU)	Weedy	20	186	94	301
	Sunn hemp	25	92	139	256
	Hairy indigo	5	97	111	213
Frog Song Organics	Weedy	6237 a	217	273 a	6727 a
	Sunn hemp	473 b	0	8 b	481 b
	Hairy indigo	2709 b	0	0 b	2709 b
Rosie's Organic Farm	Weedy	200	3796 a	214 a	4267 a
	Sunn hemp	1	42 b	46 b	89 b
	Hairy indigo	0	182 b	18 b	200 b

**Table 3.** Weed biomass at Barefoot Farm (Lake Butler, FL) in response to sunn hemp, hairy indigo, sesame cover crops, and the 4-way mixture at 9 weeks after planting. Sunn hemp was the predominate species in the mixture representing 80% of the shoot biomass.

Cover Crop	Broadleaf	Grasses	Sedges	Total
	(kg/ha)			
Weedy	1387 a	1322 a	40 a	2749 a
Sunn hemp	39 b	22 b	11 b	73 b
Hairy indigo	268 b	330 b	2 b	600 b
4-way mixture	86 b	500 ab	2 b	588 b
Sesame	78 b	243 b	13 b	334 b

**Table 4.** Differential sting nematode infestation of sunn hemp (*Crotalaria juncea*) accessions 60 days after inoculation with 200 sting nematodes per pot. Accession PI 468956, the cultivar Tropic Sun, was a nonhost to the sting nematode.

Accession	Origin	Nematodes/100 cm <sup>3</sup> soil
PI 207657	Sri Lanka	4.0 bc
PI 219717	Myanmar	0.0 c
PI 250485	India	3.4 bc
PI 250486	India	3.8 bc
PI 250487	India	0.0 c
PI 314239	Former USSR	0.0 c
PI 322377	Brazil	12.8 b
PI 337080	Brazil	7.8 bc
PI 391567	South Africa	0.0 c
PI 426626	Pakistan	0.0 c
PI 468956	US	0.0 c
Corn	US	60.0 a

**Table 5.** Comparison of sting nematode populations with different accessions of *Crotalaria ochroleuca* and *C. spectabilis*, a commercial variety of *C. breviflora* and corn (a susceptible control) at 60 days after inoculation with 200 sting nematodes per pot.

Accession/Species	Origin	Nematodes/100 cm <sup>3</sup> soil
PI 274767 / <i>C. ochroleuca</i>	South Africa	0.0 c
PI 543869 / <i>C. ochroleuca</i>	Tanzania	0.0 c
PI 407529 / <i>C. ochroleuca</i>	Zaire	4.2 bc
PI 238268 / <i>C. spectabilis</i>	Australia	4.6 bc
PI 240413 / <i>C. spectabilis</i>	Australia	4.4 bc
PI 316944 / <i>C. spectabilis</i>	Brazil	9.2 bc
PI 316945 / <i>C. spectabilis</i>	Brazil	28.6 ab
PI 337081 / <i>C. spectabilis</i>	Brazil	15.0 ab
PI 217908 / <i>C. spectabilis</i>	India	0.0 c
PI 249683 / <i>C. spectabilis</i>	India	4.8 bc
PI 346295 / <i>C. spectabilis</i>	India	5.0 bc
PI 244597 / <i>C. spectabilis</i>	South Africa	0.0 c
<i>C. breviflora</i>	Brazil	25.2 ab
Corn	US	42.4 a

## Acknowledgements

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