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COMPETITION OF SICKLEPOD, Cassia obtusifolia L.,
DENSITIES ON SOYBEAN, Glycine max (L.) Merr.,
AT VARIABLE ROW DISTANCES

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By

NILSON GILBERTO FLECK

A DISSERTATION PRESENTED TO THE GRADUATE COUNCIL OF
THE UNIVERSITY OF FLORIDA
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
DEGREE OF DOCTOR OF PHILOSOPHY

UNIVERSITY OF FLORIDA

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Abstract of Dissertation Presented to the Graduate Council
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COMPETITION OF SICKLEPOD, Cassia obtusifolia L.,
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By

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Competition studies with soybeans, Glycine max (L.) Merr. "Bragg," and sicklepod, Cassia obtusifolia L., were conducted at the Agricultural Research and Education Center of the University of Florida in Quincy, Florida.

Two field experiments were established, one on May 22, 1975, and the other four weeks later, on June 19, 1975, to determine the competitive effects of various sicklepod densities and the influences of soybean row distances on weed dry matter, soybean plant characteristics, yield components and seed yield, and on soil nutrient content.

Control, low, medium, and high sicklepod densities in the first experiment were 0, 25,000, 53,000, and 77,000 plants/ha, respectively; while the second experiment presented control, low, medium, and high sicklepod densities of 0, 36,000, 68,000, and 122,000 plants/ha, respectively.

Three soybean row distance treatments were tested using a constant pattern of 90-, 60-, and 45-cm widths throughout the growing season. Three other treatments, evaluated in a variable pattern, were initially

seeded in 30-cm row widths. Five weeks after planting, an appropriate number of soybean rows were harvested from the 30-cm pattern to establish row distances of 90, 60, and 30-60 cm for the remainder of the season.

In the greenhouse a test was conducted to evaluate the effects of those variables on seed germination and seedling vigor for the next soybean generation.

As a result of full-season sicklepod competition, soybean plants were less branched, set fewer leaves, and presented thinner stems as compared to the control. However, height of soybean plants was not affected by the presence of sicklepod. In one of the two experiments, number of nodes decreased for soybeans under weed competition.

The yield components--number of pods, number of seeds, and seed yield per soybean plant--were all similarly reduced due to weed competition. Seeds per pod were decreased to a lesser extent.

Soybean seed yields per unit area were significantly diminished by increasing levels of sicklepod infestation. While the control produced 3120 kg/ha, the sicklepod densities of 25,000, 53,000, and 77,000 plants/ha reduced seed yields 47, 65, and 73%, respectively.

As soybean row distances decreased, number of branches, number of leaves, and stem diameter of soybeans decreased. However, the height of soybean plants increased with narrowing of row width.

The components of seed yield--number of pods, number of seeds, and seed yield per soybean plant--diminished as row spacing was reduced. Maximum difference between row distances for these attributes was attained for soybean plants under weed-free conditions.

Generally, as row width decreased, soybean seed yield per unit area increased. Specifically, soybeans in 90-cm rows, either in constant or variable row pattern, yielded less than soybeans in 60- and 30-60-cm rows in the variable pattern.

Soil contents of phosphorus, potassium, calcium, and magnesium were not affected by the various levels of sicklepod and soybean populations. Neither the sicklepod densities nor the soybean row distances influenced seed germination and seedling vigor in the next soybean generation.

Sicklepod was a strong competitor with soybeans at all density ranges investigated. Because sicklepod grows taller than soybeans during the reproductive stages of the crop, limited success can be reached by varying row spacing alone. However, this practice is considered an integral measure to complement other methods of sicklepod control.

Compared to constant rows, the soybean cropping system using variable row spacings presents the choice of planting soybeans at close row spacings to provide early competition with weeds and the possibility of obtaining a forage crop after the first month of growth, without any decreases on the final seed yields.