

Thesis Title Study on planting-date of soybean relay-cropping
with corn in the rainy season at Khon Kaen

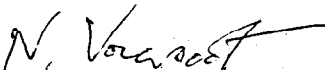
Author Mr. Phat Vibooncharoenphol

Thesis Advisory Committee



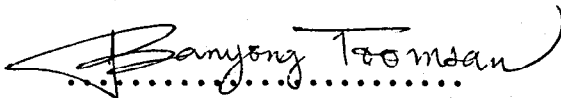
..... Chairman

(Dr. Viriya Limpinuntana)



.....

(Associate Professor Dr. Nimitr Vorasoot)



(Dr. Banyong Toomsan)

ABSTRACT

The objectives of this study were to find the suitable age of corn to be relayed with soybean in the corn/soybean relay-cropping pattern and to compare the yields and economic returns of corn/soybean patterns with double cropping patterns which included corn and soybean. The varieties of corn and soybean were Suwan 2 and S. J. 4 respectively. Two experiments were performed at Khon Kaen, a province in Northeast of Thailand.

The first experiment was run under rainfed condition from 21 May to 27 December 1988. The experimental design was a randomized complete block having 4 replicates with 7 treatments. The treatments included 3 patterns of relay-cropping of corn with soybean and 4 double cropping patterns. The relay-cropping patterns consisted of (1) corn/soybean (when corn was 60 days old) (2) corn/soybean (when corn was 80 days old) and (3) corn/soybean (when corn was 100 days old). The double cropping patterns

were (1) corn-soybean (planted soybean right after harvesting corn) (2) corn-soybean (planted soybean 20 days after harvesting corn), (3) corn-corn and (4) soybean-corn. Corn was planted at 75x50 cm. with 2 plants per hill in all treatments. Soybean was planted at 75x20 cm. in relay-cropping and 50x20 cm. in double cropping treatments with 2 plants per hill.

Relaying soybean into rows of corn at different corn ages from 60 to 100 days did not decrease corn yields, which were found to be from 528 to 557 kg/rai (1 ha = 6.25 rai). Relaying soybean at 80 days tended to give highest soybean yield at 69 kg/rai. Soybean yields from relay-cropping (50-69 kg/rai) were not different from yield of soybean (66 kg/rai) grown right after harvesting corn. Soybean from relay-croppings even produced higher yield than soybean grown 20 days after harvesting corn, which only yielded 35 kg/rai. Nevertheless, soybean yields from relay-cropping were 4 to 5 times lower than yields obtained from soybean grown early in the rainy season in the soybean-corn pattern. Similarly to soybean, the yield of corn grown as the second crop (286 kg/rai) was much lower than when grown as the first crop (500 kg/rai).

Economic returns from all cropping patterns were compared in term of gross income and net income after deducting labor and chemical inputs. The market prices of corn and soybean were computed at 2.50 and 9.50 baht/kg respectively (1 US dollar = 26 baht). The soybean-corn pattern gave the highest return with 2,853 and 936 baht/rai for gross and net income respectively. The pattern that gave the lowest return was corn-soybean (planted soybean 20 days after harvesting corn) which generated 1,647 baht/rai for gross income and -98 baht/rai for net income. Income derived from the remaining 5 patterns were in the range from 1,861 to 2,025 baht/rai. The corn/soybean (when corn was 80 days) tended to return higher net income than the corn-soybean and corn-corn patterns. This is because the two double cropping

patterns required more labor for land preparation to plant the second crop whereas planting soybean into rows of corn was done by drilling and therefore used less labor.

Layout of the second experiment was similar with the first experiment. Duration of the second experiment was from 10 June to 23 December 1989. Supplementary irrigation was given to crops 35 days after beginning of the experiment. There were 7 treatments 6 treatments were similar to those in the first experiment whereas the corn-soybean(planted soybean 20 days after harvesting corn) was replaced by the corn/soybean(when corn was 40 days). Planting soybean into rows of corn when corn was 40 days old gave highest corn yield(364 kg/rai) when compared to the average yield of corn(258 kg/rai) grown as the first crop in double cropping patterns. Throughout the growing period of corn, the plot of corn/soybean received about 65% more amount of the combined fertilizer N-P-K than the plot of double cropping pattern.

Among the relay-croppings, planting soybean into rows of corn when corn was 60 days tended to give the highest soybean yield (56 kg/rai) which was even higher than yield of soybean (34 kg/rai) grown in the corn-soybean. Among all treatments, the lowest soybean yield (11 kg/rai) was obtained from the corn/soybean(when corn was 40 days) whereas the highest yield (200 kg/rai) was produced when grown soybean as the first crop in the soybean-corn pattern.

Economic return analysis on all treatments produced similar results to that of the first experiment. The soybean-corn still produced the highest return with 2,370 and 561 baht/rai for gross and net income respectively. The rest of the treatments yielded the returns from 775 to 1,324 baht/rai for gross income and from -894 to -151 baht/rai for net income. Such net income loss of most cropping patterns was due mainly to poor yields of both corn and soybean, when compared to those in the first experiment.