Research Notes: Vietnam: Exotic soybean yield performance trial in the Mekong Delta in SR Vietnam

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The test was conducted on a brown, silty, clay loam. The soil was quite acidic for soybeans, but it is fairly representative of the soil types in the area. With a pH of 5.1, there was an adequate amount of available calcium; however, the availability of N, P, and K was quite low.

Twelve varieties were included in the test. Ten of the varieties were products of plant breeding in the United States, one came from the Philippines, and one came from Brazil.

Germination was nearly 100% for all varieties in the test. Initial plant vigor was good. Overall plant development was adequate during the first three weeks of growth; however, several varieties began to flower within the fourth week after planting with a cessation of vegetative growth. Within six weeks after planting, all but 'Improved Pelican' and 'Santa Maria' were in full bloom or flowering had already peaked and pods were beginning to form. Further vegetative development had ceased by the sixth week in all but Improved Pelican, 'L 114', and Santa Maria.

Some explanation as to the dwarfness in this test can be attributed to the soybean plant's dependence upon the length of the dark period to initiate blooming. Soybean plants begin fruiting and mature primarily in response to changing daylengths, a condition referred to as photoperiod response. An exception was Improved Pelican, which performed independently of the photoperiod. During the dry season and at the beginning of the monsoon rains, temperatures are quite high and the daylength is much shorter than the optimum 14.5 hours required for most southern U.S. varieties. The daylength during this test ranged from approximately 12.5 to 13 hours, thus stimulating flowering soon after germination before the plants could significantly develop vegetatively.

Besides the dwarfed condition and early maturity noted in most varieties, other conditions such as the number of lateral branches, number of pods per plant and the number of seeds per pod might be of interest in determining adaptability.

It might be significant to note that 'Bragg', Maturity Group VII, even though the average plant height was only 23.25 cm, had almost double the number
of pods as any other variety in the test, including Santa Maria, Improved Pelican, or L 114. Bragg matured in less than 100 days, which is desirable, especially if soybeans are to be grown during the dry season away from a source of irrigation. 'Verdee', Maturity Group III, appeared to have been the variety most adversely affected by the photoperiod. Besides the dwarfed condition of the plant itself, the pods were small and wrinkled. Initially, the seed of Verdee were the largest planted. 'Hardee' appeared to have some possibility.

During the course of the test, plants were periodically pulled to examine the amount of nodulation. All varieties appeared to have sufficient nitrogen during growth except Improved Pelican. Upon examining the roots of this variety, no nodules were found, indicating that the strain of *Rhizobium* used is not specific for this variety. In all other varieties, the nodules observed were plentiful and pink on the interior indicating functional bacteria.

Another consideration that must be taken into account when growing short or dwarfed plants is competition from weeds when grown in the presently recommended row spacings. Even with the use of a herbicide that controlled weeds initially, the lack of shading by the soybean plants and heavy rainfall resulted in a serious weed problem that could only be corrected by hoeing or hand-pulling. Possibly by seeding initially in a narrower row, i.e., 25-30 cm, or by broadcasting seed of short or dwarfed varieties, the problem of weed competition can be overcome.

Soybean mosaic virus was observed in all varieties; however, it did not appear to have caused any serious problem. Very little damage was encountered by insects as the spray program with agricultural chemicals was effective.

The test tended to confirm the suspicion that the majority of American varieties are generally not well-adapted to the Mekong Delta area of Vietnam. The main reason for this apparent lack of adaptability is the difference in photoperiod between the two areas. It is known that soybeans are extremely sensitive to changes in the photoperiod. Most U.S. varieties grown under Vietnam's photoperiod conditions will be early-maturing and dwarfed in size. In most cases, full season varieties generally yield more than those that mature very early.

Only varieties 'Bragg' and possibly Hardee of the dwarfed varieties appear to have any possibilities of eventual commercial production in Vietnam due to the heavy set of pods as well as their early maturity.
It is felt that Bragg and Hardee should also be tested further but on a narrower row to aid in weed control. By decreasing row width, there will be a need for a heavier rate of seeding; therefore, yields will have to be higher to justify the increased cost of seed.

If continued emphasis is placed on introducing and screening U.S. varieties, only those varieties that fall in Maturity Group VII and/or VIII should be considered.

Chu Huu Tin

There are 10 maturity classes of soybeans -- the higher the number, the later the maturity and the further south the variety is adapted for full-season use. The broken lines across the map are hypothetical. There are no clearly cut areas where variety is or is not adapted. (Adapted from Modern Soybean Production by W. O. Scott and S. R. Aldrich)