# SELECTION CRITERIA FOR SOYBEANS UNDER VARYING CROPPING SYSTEMS AND ENVIRONMENTS

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ABSTRACT

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Twenty-four soybean varieties were grown under five growing conditions, namely; lowland mulched following rice dry season, upland open wet season, upland shaded wet season, upland open dry season, and upland shaded dry season, to determine the responses and adaptability of these varieties to changes in growing conditions, to study the genotypic and phenotypic correlations between yield and certain characters, and to establish criteria in selecting for maximum bean yield under various growing conditions.

The major sources of variation in characters and yield were largely due to the main effects of varieties and growing conditions, and the interaction between variety and growing conditions.

Average bean yield over all varieties was highest under the open wet season planting, and lowest under the shaded dry season planting. Among the varieties, UPL-SY 2 produced the highest bean yield, followed by Kaohsiung #3, and Williams. Hill and Lincoln, on the other hand, produced the lowest yields.

Of the twenty-four varieties, none of them could be identified as ideal variety having general adaptability and maximum phenotypic stability. UPL-SY 2, Kaohsiung #3, Tainung #4, and Clark 63 were well adapted to all environments, but these varieties exhibited low

phenotypic stability. Wayne, L-114, and #29, on the other hand, exhibited high phenotypic stability but produced low yields.

The correlation between yield and other characters were not consistent from one environment to another, suggesting that the selection criteria for different environments need not be the same. Further analysis, however, showed close similarity in performance between shaded and open environment while that at the lowland deviated substantially. These results suggest that a separate performance test, both in the preliminary and advanced trials, should be conducted for developing varieties to be planted after lowland rice. On the other hand, a common preliminary trial can probably serve both upland open and upland shaded conditions.

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# INTRODUCTION

In Southeast Asia, soybeans are grown either as upland monocrops, secondary crops following paddy, or intercropped with plantation crops. With land holding in Southeast Asia becoming smaller and smaller, the intensive use of land becomes a natural recourse. Intensive cropping is already practised in Taiwan and Indonesia and, to some extent, in Thailand and Philippines. The use of space under plantation crops has not been fully utilized, but in the future it will be cropped to augment production.

One of the crops suitable for intensive cropping is soybean. Soybean is now commonly planted following rice in Indonesia, Taiwan, Thailand and Vietnam; intercropped with either corn or sorghum; and planted under rubber and oil palm trees in Indonesia, Malaysia, and Thailand.

The problem of varietal adaptation of soybean to different cropping systems is essential. Varieties that are currently planted were bred for monocropping under upland conditions, or selected by farmers themselves through trial and error. This is so because breeding institutions have not felt the need to screen and develop varieties appropriate for different cropping systems.

Soybean is more sensitive to changes in growing conditions than most crop species. Its yield is much affected by climatic changes like temperature, daylength, and rainfall. Yield is also affected by stress factors such as mutual shading as in intercropping, lack or over supply of moisture, and soil compaction as in paddy fields.