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## Breeding of The Soybean Varieties, Aged Maturity and Resistant To Rust Disease

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### Abstract

Rust disease, caused by *Phakopsora pachyrhizi*, Syd. is one of the many diseases that cause losses and important disease of soybean in soybean producing countries in Asia, Australia, USA and Indonesia. The disease has resulted also it is very significant in economic losses in Taiwan, Thailand, Indonesia, Philippines, Vietnam, and in some parts of China, Japan, Australia, Korea, and India. Experiments Carried out in the field with a randomized block design (RAK) was repeated three times using four genotypes namely POLIJE-2 and POLIJE- 3 for the parent of a high production and a short maturity and varieties Rajabasa and Ring-1 and for the donor parent who have the advantage of rust disease resistance. Crosses performed to Obtain 16 cross offspring consisting of 12 hybrids and 4 parent-shelving results conducted on the experimental pots. Furthermore, 16 genotypes of F1 seeds were planted in the field using a randomized block design (RAK). In the F1 plants with the plant resistance test performed IWGSR method, age maturity pod (R7), the production of seeds per plant, days to flowering (R1) and the number of pods per plant, where the parameter is used as the basis of Unmatched genotypes from crosses. The results of four studies selected Among the Plant selection results in as many as 71 lines, with criteria grain yield per plant ranges between 17-32 grams, peas ripe maturity of 70-76 days after planting and leaf rust resistant disease caused by the fungus *P. pachyrhizi*, number of pods ranging from 53-160 and weight of 100 seeds ranges from 11-17 g.

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## 1. Introduction

The main objective of soybean breeding program is to obtain varieties are high yielding. According to Sumarno and Fehr (1982), the factors that cause low seed yield of soybean per hectare which may be approached in terms of breeding, as (a) the potential results, (b) the age of the plant, (c) resistance to important diseases such as leaf rust, viruses, and nematodes, (d) mportant pest resistance, seed flies (*Ophyomyia phaseoli*), worms, leaf (*Prodenia litura*), caterpillars inch (*Plusia chalcites*), leafhoppers soybean (*Phaedonia inclusa*), pods destructive pests, especially caterpillars grain borer (*Etiella zinckenella*), (e) tolerance to low pH, (f) tolerance to shade, and the quality of the seeds in the seed storability.

Combining all the good qualities into a single high-yielding varieties is very difficult; yet regionally issues faced not related to any of these factors, so the varieties to be obtained may constitute the combined one to three factors alone. Rust diseases caused by *P. pachyrhizi*, is one of many diseases that cause damage and disease are important soybean in soybean-producing countries in Asia, Australia, USA and Indonesia (Sudjono, 1979). The disease has also been constitute significant economic losses in Taiwan, Thailand, Indonesia, the Philippines, Vietnam, and in some parts of China, Japan, Australia, Korea, and India (Tszchanz and Shanmugasundaram, 1985).

Infectious diseases rust on soybean plants before the formation of pods, will greatly affect the formation of pods, pod filling, and reducing the number of seeds are formed, so that the production decline. Conversely, when the attack occurred after the formation and pod filling, the effect on soybean production is relatively small (Mardinus, 1986).

An effort to overcome losses from leaf rust disease that has been done is through crop rotation, the use of pesticides, and planting resistant varieties. Suprpto (1992) suggested that the use of resistant varieties can reduce yield losses due to soybean rust pathogen attack. The use of resistant varieties is a best method, because it is more economical and not the Result environmental pollution. Soybean is an important crop because of its role as a source of vegetable protein and can be used as industrial raw materials. In Indonesia the result is still low so every year need to import large enough to meet national demand (Karamoy, 2009). The low productivity of soybean and high production costs caused soybean production in the country is still very difficult to keep pace with the increasing demands, but by looking at the potential production is still possible to be improved. Leaf rust disease caused by *P. pachyrhizi* often affects soybean plants is one of the causes of low production.

The resistance of varieties is one important component of disease control and very beneficial in crop protection. The resistance of varieties is the nature of a population of plants that allow the population to withstand the attack of a kind that cause disease so that damage is not meant for production decline (Sudjono, 1979). Soybean varieties have different resistance. The resilience of one variety of soybean rust pathogen can vary depending on the location of the testing and the age of the plant (Semangun, 1990). Suyamto et al. (1990) reported that the resistant soybean varieties are generally dark green leafy, a bit old, and live longer than those susceptible. Known, each plant has a mechanical and chemical barrier different. According to Hartana (1986) mechanical barriers may be morphological factors that exist in every plant, could form the content of wax, cuticle thickness, leaf epidermis and stomata. Bonde et al. (1976); McLean (1979) and Sudjono et al. (1975) reported that the pathogen infection leaf rust on soybean plants not through stomata, or rarely directly to the stomata, but the infection sprouts uredospore directly penetrate the epidermal tissue, so that the wax layer and the epidermal tissue is thick will hinder or prevent the entry of fungi into plant tissue.

Soybeans are known to produce a phytoalexin, which can also determine plant resistance to pathogen infection. Day (1974) states that phytoalexin produced in response to invading pathogens host plant. Keen (1981) reported that a compound phytoalexin gleceolin on cotyledons. Ingham et al. (1980 In Keen, 1981) reported gleceolin isomer III on soybean leaves. Moreover, Keen (1981) reported that the cause gleceolin accumulated in the plant tissue are biotic factors, and directly or indirectly in the biosynthesis induced by certain enzymes.

Plants that are resistant or susceptible actually equally produce phytoalexin, but the resistant plant phytoalexin formed more quickly with quantity more (Brown, 1980). Keen (1981) reported that the resistant plant phytoalexin able to inhibit or halt the growth of pathogens. According to Sudhanta and Prayitno (1987) the older the soy it contains prohibitin and phytoalexin used to inhibit the development of rust fungi growing decline. Keen (1981) reported that the type of resistance which appears as a result of activity of phytoalexin synonymous with vertical resistance.

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