STUDIES ON SOME FUNGI CAUSING ROOT-ROT OF SOY BEAN

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B.Sc. (Plant Pathology) 1963

M.Sc., (Plant Pathology) 1967

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THESIS

Submitted in partial fulfilment of the Requirements

for the Degree of

DOCTOR OF PHYLOSOPHY

in

Plant Pathology

Department of Plant Pathology

Faculty of Agriculture

Ain Shams University

Cairo, Egypt

1973

APPROVAL SHEET

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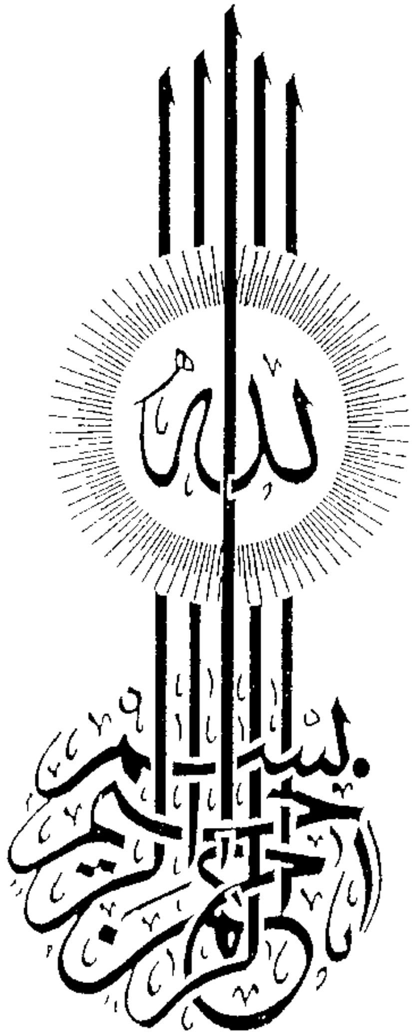
Date: / /1973


بسم الله الرحمن الرحيم

Acknowledgement

The author wishes to express her sincere appreciation and gratitude to Dr. Abdel-Rahman Sirry, Dean of the Faculty of Agriculture at Zakazik for the course of this investigation.

Thanks are also due to Dr. E.K. Allam, Prof. of microbiology., Fac. of Agric., Ain Shams University for his supervision and generous help.

Deep thanks also to all members of Plant Path. Dept. Faculty of Agriculture , Ain Shams University , and the Agricultural Experiment station Min. of Agric. whom their help made this work possible.

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Introduction

Soy bean (Glycine max (L.) Merr.) is native to western Asia. It was extensively cultivated and highly valued as a food in China. The first record of the plant is contained in books by Emperor Sheng-Nung, written in 2838 B.C., describing the plants of china Markley (1950).

Because of the increased emphasis on oil during and after World War II, Soy bean became known as an oil seed crop rather than a forage crop. It may also be described as a protein crop. About 90% of the oil is used for human consumption, mostly as margarine, salad oil, and shortening .

The following outline shows the manifold uses to which soy beans may be put. Few other plants are useful in so many ways Kuell Hinson (1967).

BEANS

- Plant
  - Green manure
  - Forage
    - Hay
    - Silage
    - Soiling
  - Pasture
- Meal
  - Celluloid substitute
  - Stock feed
  - Fertilizer
  - Human food
    - Breakfast foods
    - Diabetic foods
    - Flour
      - Breads
      - Cakes
      - Pastry
    - Infant food
    - Macaroni
    - Crackers
    - Soy milk
    - Bean cured
    - Soy souce
    - Bean powder
  - Glue
  - Vegetable casein
  - Water paints
- Oil
  - Glycerin
  - Enamels
  - Lighting
  - Varnish
  - Water proof goods
  - Linoleum
  - Paints
  - Soap stock
  - Celluliod
  - Rubber substitutes
  - Printing inks
  - Food products
    - Butter substitutes
    - Lard sub.
    - Edible oils
    - Salad oils
  - Lubricating
  - Core binder
  - Candles
  - Lecithin.
- Green beans
  - Green vegetable
  - Canned
  - Salads
- Dried beans
  - Stock feed
    - Sheep
    - Hogs
    - Cattle
    - Poultry
  - Soya souce
  - Boiled beans
  - Baked beans
  - Soups
  - Cofee sub.
  - Vegetable milk
    - Bean curd
      - Fresh
      - Dried
      - Smoked
      - Fermented
    - Condensed soy-milk
    - Fresh soy-milk
    - Confections
    - Soy-casein
      - Paper
      - Paints
      - Textile
      - Dressing
      - Water
    - Soy-milk powder
  - Breakfast food

Trails are recently made to cultivate soy bean as a wide scale crop in Egypt. As a new crop, it is important to solve the problems which might face its production. The study of plant diseases infecting this crop is thought to be of high practical importance. Amont these root-rot which causes considerable losses to the cultivated plants. This problem appeared in many areas in the experimental stations.

Therefore it was found valuable to carry on extensive study on this disease under Egyptian conditions.

In this investigation, soy bean plants showing clear symptoms of root-rot disease were collected and the pathogens were isolated and their pathogenicity was determined. The susceptibility of different soy bean varieties to the disease was also studied. The rhizospheric microflora of different plant varieties were estimated in a trial to correlate the relation between their degree of susceptibility to the disease and the rhizoespheric content.

The effect of organic manuring on controlling the disease was studied and trials were made to correlate these results with rhizospheric microflora.

The effect of mineral fertilizers "Nitrogen, Phosphorus and potassium either alone or in conbinations on disease severity

REVIEW OF LITERATURE

Causal organism:

Soy bean roots are susceptible to infection with rotting which cause considerable losses to the cultivated plants. Root-rot of soy bean caused by Rhizoctonia solani were observed by Reinking (1918), Nacion (1924), Anon (1943), welch (1947), Kernkamp (1942), Boosalis (1950), Kilpatrick, Howard (1953), John and Dunkevy (1959).

Narasimhan (1934), Anon (1943), Petty (1943), Anon (1956), and Hartzfeld (1957), attributed the disease to Rhizoctonia spp.

Other investigators reported other pathogens as the causal organism of soy bean root-rot, Wolf and Lehman (1926), Van der Goot and Muller (1932), Anon (1943), Person 1944, Weiss (1940), and Anon (1953), attributed the desease to Sclerotium rolfsii.

Kilpatrick and Howard Johnson (1953) found Sclerotium rolfsii on hypocotyl and stem.

On the other hand Anon (1953) and Kilpatrick, Howard Johnson (1953), noticed species of Fusarium caused root-rot to soy bean and isolated Fusarium oxysporium from roots, cotolydon, stem and leaflet.

Lehman and Graham (1926), Welch (1947), Anon (1943) and Dunleavy (1959) stated that *Pythium debaryanum* caused soy bean root-rot.

Anon (1943), Person (1944) and Maud (1945) and Kilpatrick Howard Johnson (1953), found that *Rhizoctonia bataticola* Toub, is the main pathogen of the disease.

Fungicides:

Kochler (1944) illustrated that seed treatment with Spergon increased the yield.

Anon (1943) found that treating seed of Virginia soy beans with Spergon and New improved Ceresan was effective in preventing seed rots and preemergence damping off when the seeds were sown in naturally infected Soil with *Rhizoctonia solani*. Differences between New improved ceresan and Spergon were not significant.

Koehler (1944) Showed that Spergon was the best fungicide for seed treatment of Mancha type in northern states. Huberger (1945) recommended that Dithane applied as a soil disinfectant at 100 Ib per acre at planting time severely damaged soy bean seeds. Spergon is considered the best for seed treatment of soy bean.

Stoddard (1945) reported that seed treatment of soy bean with Arasan, Semesan and Spergon gave protection against seed rots and pre-emergence damping off. Porter (1946) reported that Arasan, Spergon and Semesan were effective as protectants for the seeds of soy bean. Hildebrand and Koch (1947) found that Spergon, Arasan and Fermate increased emergence.

Kern Kamp (1948) recommended Spergon as seed treatment after inoculation with module bacteria.

Lehman and Graham (1948) reported that emergence was increased and disease seedlings decreased more by Arasan than by Spergon.

Hildebrand and Koch (1950), found that Spergon increased both emergence and yield of treated seeds. Spergon appeard more effective than Arasan, Fermate, Phygon and Phygon xl. Kendrick and John Middleton (1954), mentioned that Nabam was consistantly effective in soil against wide variety of fungi but at only 100 p.p.m. Pentachloronitrobenzene was effective against *Rhizoctonia solani*. The material apparently acted as a fungistat but not as a fungicide.

Rushdi (1955) found that in liquid medium 20 p.p.m. Thiram, hydroxymercurichlorophenol, sodium ethyl dithocarbomate, sodium mercapto benzothiazole completely inhibited the growth of Rhizoctonia solani , Young and Brandes (1955) found that Zineb suspended in 5 to 10 gal. of water and applied at 3.25 Ib. active ingredient per acre by spraying into the seed furrow during time of planting decreased seedling infection.

Anon (1956) reported that a good control of Rhizoctonia root-rot of bean was achieved with Capten.

Dunleavy (1959) found that chemicals, breeding and crop rotation are useful in controlling Fusarium root-rot of Soy been . Tachibana (1969) used six soy been varieties (Amsoy, Corsoy, Hard, Disoy, Hawkeye 63 and Wayne) and treated them with N-trichloromethylmercapto -4 Cyclo hexene 1,2 dicarboximide (Captan) and Penta-chloro nitrobenzene, 5- ethoxy-3-trichloromethyl -1,2 thiadiazole (Teraclor Super (X), in field known to be infested with Rhizoctonia solani and Phytophthora megasperma var. Sojae. Yield increases were obtained even though stands were not improved.

Organic manuring:

Blair (1943) found that, in the absence of any host, the effectiveness of organic amendments in reducing growth of Rhizoctonia solani in soil was found to be improved by the addition of nitrogen.

[illegible] (1946) stated that in soil amended with manure, however, increases in numbers of various groups of rhizosphere microorganisms occured.

Sanford (1947) found that <u>Rhizoctonia solani</u> Khun. can be effectively suppressed by adding decomposable organic matter to the soil.

Tyner (1948) pointed out that moribund root tissue would greatly stimulate higher numbers of rhizosphere microorganisms. Warren, Graham and Gale (1951) reported that actinomycetes inhibited the growth of <u>Rhizoatonia solani</u> on agar media. Wood (1951) , found that saprophytic microflora associated with the decomposition of soil amendments were assumed to play an important role in the control of <u>Rhizoctonia solani</u> Khun. Sanford (1952) found that the organic amendments added to the soil had a great effedt on the persistance of <u>Rhizoctonia solani</u> Khun in soil.

Wood and Tveit (1955) summarized the importance of antagonistic microorganisms in reducing disease severity in connection with plant root diseases.

Kommedahl and Young (1956) found that the decomposable organic amendments can affect the persistance of <u>Fusarium spp</u>. and <u>Rhizoctania solani</u> in soil.