Scientific advancement is quite essential for national progress. For an agricultural country like India it is much more necessary. The recent advances in scientific work stated above hold promise of giving rise to practical developments which would be of great interest to those engaged in coconut growing and the coconut industry in general.

REFERENCES.

1. "Recent Research on the Coconut Palm with special reference to Ceylon" by Reginald Child.
Empire Journal of Experiments in Agriculture, Vol. 18., No. 71, 1950.)
2. The Indian Central Coconut Committee—Seventh Annual Report. (1st April, 1951 to 31st March, 1952.)
3. The Indian Central Coconut Committee—Eighth Annual Report. (1st April, 1952 to 31st March, 1953.)
4. 'Coconut Cultivation' by C. M. John.

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https://doi.org/10.29321/MAJ.10.A04261

Studies on '*Anthracnose*' of French Beans

by

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Introduction: *Colletotrichum lindemuthianum* (Sacc. and Magn.) Bri. and Cav., which is responsible for the disease known as 'anthracnose' affecting french bean (*Phaseolus vulgaris*. L.), Scarlet runner bean (P. *multiflorus* L.) Cowpea (*Vignacatjang*. L.) and *Dolichos lablab* L.) enjoys wide distribution almost in all countries. But whether the disease on these hosts is due to the same fungus or to different races of it, or to distinct but related species has not been definitely established (Butler and Jones, 1949).

In this state 'anthracnose' of french bean is prevalent on the Nilgiris and the Palnis.

In India 'anthracnose' of *D. lablab* has been reported by Butler (1917). Subramaniam (1953) has described the same from Coimbatore and has identified the pathogen as *Colletotrichum lindemuthianum* (*Glomerella lindemuthianum*).

In order to determine whether the pathogens causing the two diseases in this State belong to the same species, investigations were undertaken and the results of these studies are presented in this paper.

Materials and Methods: The fungi were brought into pure culture from fresh specimens of infected host material obtained from the Nilgiris and Coimbatore respectively by the single spore isolation method. The agar media employed in the studies were prepared according to Riker and Riker (1936). The plants for inoculation studies were raised from selected, healthy seeds. Pods used for inoculation were surface sterilised and kept inside sterilised moist chamber. Inoculations on host plants were carried out by spraying spore suspension or by placing bits of culture on them. The inoculated plants were covered with alkathene bags or with bell jars to maintain high humidity. The isolate from french bean was maintained in the refrigerator at 60°F.

Experimental Results: The spores of the fungus from *Dolichos lablab* exhibited abundant germination even at the laboratory temperature in distilled water but the spores of the fungus from french bean (*P. vulgaris*) did not germinate in distilled water at laboratory temperature (82°F to 85°F). The germination of the spores from french bean was tried in various media under different temperature conditions and satisfactory germination was obtained only in french bean agar at 60°F Even at this temperature it took 72 to 76 hours for the germ tubes to develop The spores from *D. lablab*, germinated freely within three hours at laboratory temperature.

As a result of these studies it was found that for maintaining the culture of the french bean isolate, the culture plates and the culture tubes had to be kept inside the refrigerator at 60°F., while the cultures of the other isolate could be maintained at the laboratory temperature (82°—85°F). The former isolate made satisfactory growth only on french bean agar and not on oats or Richards' agar, while the isolate from *D. lablab* grew well on all these media. A comparative estimate of the growth and sporulation of the two isolates on french bean agar at 60°F and 82°F was made and the results are given below.

TABLE I.

Isolate	Diameter of growth in 9 days (m. m.)		Sporulation	
	60° F	82° F	60° F	82° F
Frenchbean isolate ..	31	10	Numerous acervuli present	Growth negligible
Dolichos lablab isolate ..	21	71	Sporulation scanty, visible after a week, Growth poor.	Numerous pink acervuli, sporulation commenced in 3 days.

It is evident from the data that the french bean isolate thrives under low temperature while the *D. lablab* isolate requires higher temperature for satisfactory growth and sporulation. This is in keeping with the natural distribution of the two isolates.

Pathogenicity: To determine the relative pathogenicity of the of the two isolates inoculations were carried out on the stem of *D. lablab* Horsegram *(D. biflorus)*, Cowpea *(V. catjang)* and pods of french bean *(P. vulgaris)*, *D. lablab* and cowpea. The inoculations were carried out in two series, one at the atmospheric temperature under green house condition while the other was made on hosts kept at 60°F. in the refrigerator. It was found that the french bean isolate infected only the pod of french bean in the series kept at 60°F. Positive infection was not obtained even on french bean pods kept at green house temperature. The isolate from *D. lablab* infected only the stem and pods of *D. lablab* in the series kept in the green house. There was no infection at 60°F.

Measurements of Conidia: The spores of the two isolates obtained from fresh host material were measured to find out whether any differences existed between them. No difference could be observed either in the shape of the spores or in their size and they exhibited similarity in spore characters. The following measurements were obtained:

French bean isolate — $16 \times 6\mu$ (12 to 25×3 to 6μ).

Dolichos lablab isolate — $17 \times 6\mu$ (12 to 22×3 to 6μ)

Discussion: The studies have shown that though there are no morphological differences between the isolates, considerable differences are exhibited in their pathogenicity and cultural characters. The isolates are found capable of infecting their own hosts only and appeared to be highly specialised in their parasitism. Many races are known to exist in *Colletotrichum lindemuthianum* exhibiting differences in their capacity to infect different varieties of french bean (Butler and Jones, 1949). The optimum and maximum for growth lie between 22 to 23°C. and 30 to 31°C. respectively, but records exist were the maximum is stated to be 33 to 35°C. Here again it is evident that different races exhibit differences in their temperature relations. The differences exhibited by the two isolates understudy go to show that there exist in this species low temperature races and high temperature races each being confined to certain climatic conditions. Ramsay and Wiant (1941) state that humidities of about 95% at temperatures between 64°F. and 65°F. are favourable for germination of the spores and penetration on hosts by *C. lindemuthianum*. This is more or less in agreement with the results obtained with the french bean isolate. The other isolate is obviously favoured by higher temperature for germination, growth and infection.

It is considered that though there are differences in the pathogenicity and cultural characters they are found to be morphologically alike and therefore belong to the same species.

Summary: The fungus *C. lindemuthianam* isolated from french beans is observed to be a different strain from that affecting *D. lablab*. The french bean isolate failed to infect *D. lablab*, Cowpea and Horsegram and requires an optimum temperature of 15°C. for its development and infection.

Acknowledgement: I am grateful to Sri, T. S. Ramakrishnan, Retd. Mycologist and Sri. M. Kandaswamy Government Mycologist in-charge for their valuable guidance and encouragement given to me in carrying out these studies.

LITERATURE.

Butler, E. J. (1918) Fungi and Diseases in Plants, Thaker, Spink & Co., Calcutta.

Butler, E. J. & Jones, S. G. (1949) Plant Pathology, Mac Millan & Co., London.

Ramsay, G. B. & Wiant, J. B. (1941) Market diseases of fruits and Vegetables. U. S.; Dept. Agric. Misc. Publication No. 440.

Riker, A. J. & Riker R. S. (1936) Introduction to Research on Plant diseases. Jhon, S. Swift Co., Inc., St. Louis, Chicago, New York.

Subramaniam, C. P. (1953) Anthracnose of *Dolichos lablab* Paper read at the Third Scientific Workers' Conference, Coimbatore held in 1953.