



FIG. 2

(a) Section of leaf showing internal hyphae, haustorium and conidiophores.

(b) Conidia.

(c) Germinating conidia.

Length		Width	
Class in $\mu$	Frequency	Class in $\mu$	Frequency
52.1—56	3	12—14.9	4
56.1—60	10	15—17.9	91
60.1—64	24	18—20.9	82
64.1—68	68	21—23.9	23
68.1—72	48		
72.1—76	39		
76.1—80	5		
80.1—84	2		
84.1—88	1		

lablab. But this is the first record of the fungus on castor.

T. S. RAMAKRISHNAN.

I. L. NARASIMHALU.

Agricultural Research  
Institute,  
Lawley Road P.O., Coimbatore,  
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Uppal, B. N., *et al.*, *Ind. Jour. Ag. Sci.*, 1936, **6**, 110.

Butler, E. J., and Bisby, G. R., *The Fungi of India*, 1931; *Sci. Mon.*, **1**, I.C.A.R.

Mundkur, B. B., *The Fungi of India*, Supplement 1, 1938, *Sci. Mon.*, **12**, I.C.A.R.

### *PYTHIUM APHANIDERMATUM* (EDSON) FITZ. ON *CARICA PAPAYA*

EDSON<sup>1</sup> in 1915 described *Pythium aphanidermatum* as the cause of damping off of seedlings of sugar beets (*Beta vulgaris* L.) and radish (*Raphanus sativus* L.) in Wisconsin, U.S.A. Since then it has been reported on a variety of hosts from various parts of the world.

Vaughan<sup>2</sup> and Gardner<sup>3</sup> report a black rot of radish due to this species in Indiana, while Bunting<sup>4</sup> attributes to it the "damping off" of tobacco in Africa. Drechsler<sup>5</sup> describes a cottony leak of cucumbers (*Cucumis sativus* L.) caused by this fungus. He<sup>6</sup> also found it to be the causal agent of a cottony leak of *Solanum melongena* in Florida. In Sumatra Jochems<sup>7</sup> isolated it from Deli Tobacco. Tempany<sup>8</sup> mentions it causing a collar disease of tomato in Malay. Recently Tasugi and Takatuzi<sup>9</sup> report *Nematosporangium (Pythium) aphanidermatum* on *Phaseolus vulgaris* from Japan. Massey<sup>10</sup> describes this species attacking cotton in Sudan and Van Eck<sup>11</sup> on Pansy in Holland.

In India Subramaniam<sup>12</sup> ascribed a *Pythium* disease of ginger (*Zingiber officinale* Roscoe), Tobacco (*Nicotiana tabacum* L.) and Papaya (*Carica Papaya* L.) to *Pythium Butleri*. Due to its great similarity with *P. aphanidermatum* Carpenter,<sup>13</sup> Fitzpatrick<sup>14</sup> and Matthews<sup>15</sup> consider *P. Butleri* synonymous with *P. aphanidermatum*. Drechsler<sup>16</sup> makes a differentiation between *P. Butleri* and *P. aphanidermatum* on

grounds of dimensions and reproductive behaviour. Later on Mitra,<sup>17</sup> Sundararaman,<sup>18</sup> Ramakrishna Ayyar<sup>19</sup> and McRae<sup>20</sup> reported its isolation from various species of Cucurbitaceae (*Opuntia dilleini*) and chilli (*Capsicum annuum* L.). Recently it was seen to cause a malodorous rot of water melon by Kheswalla<sup>21</sup> and a wet rot of tobacco seedling by Venkatarayan.<sup>22</sup> Galloway<sup>23</sup> mentions it on hemp.

Last year during the rainy season some "stem and foot rot" of Papaya trees (*Carica papaya*) was observed in an epidemic form in the Agricultural Institute Farm, Naini (Allahabad). Dr. E. F. Vestal, ph.d., Plant Pathologist of the Institute, isolated the fungus from the diseased stem by the usual method and kindly gave it to me for identification. Inoculations made by Dr. Vestal on healthy trees were partly successful. The patches caused by the fungus heal up in winter and inoculations made in the months of November and December did not show any sign of disease probably due to low temperature and dry weather. After studying the life-history the fungus was found to be *Pythium aphanidermatum* (Eds.) Fitz.

In artificial media the mycelium is well developed on corn-meal agar, bacto-peptone agar, bean agar and oat-meal agar. The hyphae are aseptate, hyaline and with granular contents; irregularly and abundantly branched, varying in breadth from 2.5-8 $\mu$  in diameter. Sporangia are formed in abundance when small tufts of aerial mycelium are cultivated for 4 to 5 days at 25° C. in a solution recommended by Petri.<sup>24</sup> They are filamentous composed of a lobulate inflated mass of branches with a long or short tube of discharge. They have also been observed on a solid medium (Bean agar). Number of zoospores varies from 4 to 30 in each sporangium. They are biciliate and bean-shaped. Oogonia are formed in abundance on oat-meal agar at 20° C. They are smooth, terminal, spherical and measure 18.9 to 28 $\mu$  in diameter. Antheridia are single (rarely 2 to

an oogonium) mostly intercalary, also stalked and terminal. Both hypogynal and diclinous conditions are to be found. Sometimes antheridia have a pointed beak. The oospores are smooth, round, thick-walled, not filling the oogonium, varying from 10.8 to 19.5 $\mu$  in diameter.

Further work on the preventive methods of the disease is in progress.

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K. S. BHARGAVA.

Department of Botany,  
University of Allahabad,  
Allahabad,  
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- <sup>1</sup> *Jour. Agr. Res.*, 1915, **4**, 135.
- <sup>2</sup> *Plant Disease Reporter Sup. U.S.A.*, 1924, **34**, 148.
- <sup>3</sup> *Proc. Ind. Acad. Sci.*, 1925, **34**, 297.
- <sup>4</sup> *Rev. App. Myc.*, 1925, **4**, 463.
- <sup>5</sup> *Jour. Agri. Res.*, 1925 *b*, **30**, 1035.
- <sup>6</sup> *Phytopath.*, 1926, **16**, 46.
- <sup>7</sup> *Rev. App. Myc.*, 1927, **16**, 444.
- <sup>8</sup> *Ibid.*, 1935, **14**, 81.
- <sup>9</sup> *Ann. Phytopath. Soc., Japan*, 1935, **3**, 245.
- <sup>10</sup> *Rep. (Gazira) Agric. Res. Serr.*, 1935, **34-55**.
- <sup>11</sup> *Rev. App. Myc.*, 1937, **16**, 813.
- <sup>12</sup> *Mem. Dept. Agric. India*, 1910, **10**, 181.
- <sup>13</sup> *Bull. Exp. Sta. Hawaiian Sug. Plant Assn. Bot. Ser.*, 1921, **3**, 62.
- <sup>14</sup> *Mycologia*, 1923, **15**, 166.
- <sup>15</sup> Matthews, *Studies on the Genus Pythium*, 1931, **51**.
- <sup>16</sup> *Phytopath.*, 1934, **24**, 7.
- <sup>17</sup> *Rept. Agric. Res. Inst. Pusa*, 1925, **45**.
- <sup>18</sup> *Rept. Dept. Agric. Madras Presi.*, 1927, **326**.
- <sup>19</sup> *Mem. Dept. Agric. India*, 1929, **16**, 191.
- <sup>20</sup> *Sci. Repts. Res. Inst. Pusa*, 1928, **44**.
- <sup>21</sup> *Rev. App. Myc.*, 1936, **15**, 587.
- <sup>22</sup> *Adm. Rep. Agric. Dept. Mysore*, 1935-36, 1937, **51**.
- <sup>23</sup> *Sci. Rep. Agric. Res. Inst. New Delhi*, 1937, **105**.
- <sup>24</sup> *Ann. del. R. Ist. Sup. forest naz.*, **3**.