Fungus and related diseases of the genus Catalpa (Bignoniaceae*).

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With 3 Textfigures.

The occurrence of certain common fungus diseases having been proven in a number of species of trees or shrubs, some authors generalized the observations and applied them *a priori* to other kinds of wooden plants. Thus, a sterile phrase like "the diseases occurs typically in ..., it may, however, occur on trees of any species" appears characteristic of Rankin. I do not agree with this author (Rankin, p. 377) as he wishes to understand that the following species are ubiquitous towards the wood substratum: *Thelephora laciniata* Fries, *Stereum purpureum* Fries and *Armillaria mellea* (Fries) Quélet. According to our knowledge, these species of fungi do not occur on *Catalpa,* and, unless further investigation will show the contrary, they cannot figure in the list of fungus diseases of *Catalpa.*

A survey of fungi (and myxomycetes) both paratrophic and saprotrophic follows, in which all species found up to this time on *Catalpa* are enumerated. In the Appendix to this paper, there are mentioned some other diseases and injuries to *Catalpa* **).

Myxomycetes.

1. *Ceratiomyxa mucida* (Pers.) Schrt. — Paclt (1946, p. 153).
2. *Tubifera* sp. — New find. Characterized *in vivo* by a pronouncedly red coloured plasmodium. On putrescent stump of *C. bignonioides.* Turnov (Metelkovy sady), Bohemia, 5. VIII. 1948, leg. Dr. Paclt.
3. *Stemonitis Morgani* Peck. — Seymour.
4. *Fuligo septica* (L.) Web. — Paclt (1948, p. 41). Further specimens collected at Král. obora, Prague (June, 1948, on *C. bignonioides*).

*) The present paper forms the Part IV. of the "Synopsis of the genus *Catalpa*", the preceding part having been published in Ber. Schweiz. Bot. Ges., **60**, pp. 591—595 (1950).

**) Pests of *Catalpa* will be treated in the Part V. of the "Synopsis".

Phycomycetes.

5. *Mucor (?) truncorum* Link. — Seymour. — According to Naumov (1939, p. 128), the species should not figure any more amongst *Mucorales.*

Ascomycetes.

6. *Erysiphe communis* Link. — Blumer; Paclt (1946, p. 153).
7. *Phyllactinia guttata* (Fr.) Lév. — Recorded from North America and China (Kiangsu: Wasih; on *C. speciosa* in cult.). "List of Diseases"; Wei & Hwang (p. 11).
8. *Microsphaera elevata* Burrill. — "List of Diseases".
9. *Capnodium axillatum* Cke. — Oudemans (p. 726).
10. *Penicillium crustaceum* Fr. — Paclt (1946, p. 154).
11. *Thielavia renominata* Paclt in litt. („Parasitica", for year 1951). — Occurring probably in company with the imperfect fungus *Thielaviopsis basicola* (Berk. & Br.) Ferr. — "List of Diseases".
12. *Hysterographium fraxini* De Not. — Oudemans (p. 723).
13. *Gloniopsis decipiens* De Not. — Oudemans (p. 724).
14. *Helotium fumigatum* Sacc. & Speg. — Oudemans (p. 725).
15. *Mollisia* sp. (? *Pezizella leguminum* sensu Saccardo). — On died capsules of *C. bignonioides* fallen to the ground overgrown with grass. At Král. obora, Prague (Nov. 3, 1948, leg. Dr. Paclt). This material has been examined also by Dr. Svrček of Prague, who believes it to belong probably to the species *Mollisia polygoni* (Lasch) Rehm.
16. *Nummularia clypeus* (M. A. Curt.) Cke. — Oudemans (p. 723).
17. *Hypoxylon catalpae* Sacc. — Oudemans (p. 724).
18. *Phyllachora cinerea* Ell. & Ev. — Oudemans (p. 723).
19. *Dothidea catalpae* Berk. & Cke. — Seymour.
20. *Enchnosphaeria caput-medusae* Sacc. & Speg. — Oudemans (p. 725).
21. *Lophiostoma subrugosum* Sacc. — Oudemans (p. 724).
22. *Didymosphaeria catalpae* J. B. Parker. — Parker; Scott.
23. *D. epidermidis* Fckl. — Described from *(C. bignonioides)* as a distinct variety (var. *catalpae* Feltg.). — Oudemans (p. 725).
24. *Didymella catalpae* Hollós. — Hollós.

25. *Pleospora Spegazziniana* Sacc. — Oudemans (p. 725); Paclt (1948, p. 41). Recorded from branches of *C. bignonioides*. If all specimens found later by me on died capsules may belong to *P. Spegazziniana* could not be determined. *P. infectoria* Fckl. or *P. herbarum* Rabh. were, perhaps, present in some instances.
26. *Metasphaeria liriodendri* Pass. — Described from the catalpa *(C. bignonioides)* as a particular variety (f. *catalpae* Feltg.). — Oudemans (p. 725).
27. *Thyridium pulchellum* Sacc. & Speg. — Oudemans (p. 726).
28. *Diaporthe catalapae* Ell. & Ev. — Oudemans (p. 723).
29. *D. petiolorum* Sacc. & Speg. — Oudemans (p. 725).
30. *D. spissa* Sacc. & Speg. — Oudemans (p. 725). Cp. also *Phoma carpogena* Sacc. & Roum.
31. *Valsa sphinctrina* Fr. — Seymour.

Basidiomycetes.

32. *Exidia saccharina* Fr. — Seymour.
33. *Dacryomyces deliquescens* Duby. — Paclt (1946, p. 154).
34. *Corticium confluens* Fr. — It ascends to certain height of the tree and occurs frequently in company with *Tomentella* sp. which, however, remains to grow only in soil or detritus: Paclt (1948, p. 41).
35. *C. cremeum* (Bres). — Paclt (1946, p. 154).
36. *C. cinereum* (Fr.) — Paclt (1946, p. 154); id. (1948, p. 41).
37. *Stereum albobadium* Fr. — Seymour.
38. *St. hirsutum* Fr. — Paclt (1946, p. 155). Found further on *C. speciosa* at Plzeň (VII. 1948, leg. Dr. Paclt).
39. *St. versicolor* Fr. — Seymour.
40. *Pistillaria mucedina* Boud. — Oudemans (p. 726).
41. *P. mucoroides* Boud. — Oudemans (p. 726).
42. *Hydnum omnivorum* (Shear) Shear. — "List of Diseases"; Wright & Wells.
43. *Gloeoporus adustus* (Fr.) Pilát. — Seymour; Paclt (1947, p. 219).
44. *Poria catalpae* (Schrenk). — Possibly a form of the following species. The cause of so-called brown butt-rot (braune Herzfäule): Schrenk.
45. *P. versipora* (Pers.) Baxter. — Paclt (1947, p. 219).
46. *Heteroporus biennis* (Fr.) Lanzi. — Occurring on *C. bignonioides* in f. *distortus* (Fr.): Oudemans (p. 726).

47. *Trametes albida* (Fr.) Bourd. et Galz. — Seymour. Found further on *C. bignonioides* at Nové Zámky, Slovakia (autumn 1950, leg. Dr. Paclt).
48. *T. hirsuta* (Fr.) Pilát. — Maneval; Paclt (1946, p. 155; 1948, p. 41).
49. *T. unicolor* (Fr.) Cke. — Paclt (1946, p. 155).
50. *T. versicolor* (Fr.) Pilát. — Schrenk; Stevens; Paclt (1948, p. 41).
51. *Schizophyllum commune* Fr. — Seymour.
52. *Coprinus micaceus* Fr. — Paclt (1946, p. 155). Further finds: Prague — Hlubočepy (on basis of a trunk of *C. erubescens*); Pieštàny, Slovakia (on basis of a trunk of *C. bignonioides*); Přerov, Moravia.
53. *Pluteus cervinus* Fr. — New find. On trunk of *C. bignonioides* (Král. obora, Prague, 3. XI. 1948, leg. Dr. Paclt).
54. *Pholiota squarrosa* Fr. — Paclt (1946, p. 155).
55. *Collybia velutipes* Fr. — "List of Diseases".
56. *Mycena galericulata* Fr. — Paclt (1943, p. 65); id. (1946, p. 156). Additional find: Turnov, Bohemia (5. VIII. 1948, leg. Dr. Paclt).

Fig. 1. „*Dematiaceae* capsularum" on capsules of *Catalpa*. Orig. × ½.

Deuteromycetes.

57. *Alternaria alternata* (Fr.). — Cp. *Dematiaceae* capsularum, ssp. div.
58. *Ascochyta catalpae* F. Tassi. — Allescher (1903).
59. *Botryta grisea* Fr. — Oudemans (p. 724).
60. *Cercospora catalpae* Wint. — "List of Diseases"; Maneval; Wei & Hwang (on *C. ovata* in China; p. 37).
61. *Chaetomella brachyspora* Sacc. & Speg. — Allescher (1903).
62. *Chaetophoma catalpae* Cke. — Oudemans (p. 724).
63. *Cladosporium bignoniae* Schw. — Cp. *Dematiaceae* capsularum, ssp. div.
64. *Cl. herbarum* Fr. — Lindau (1907); Massee (1914, p. 466, "*Hormodendron hordei* Bruhne"); Paclt (1946, p. 156).
65. *Clasterosporium capsularum* (Thm.) Sacc. — Cp. *Dematiaceae* capsularum, ssp. div.

66. *Coniothecium capsularum* Grogn. ex Roum. — Cp. *Dematiaceae* capsularum, ssp. div.
67. *Coniothyrium olivaceum* Bon. — Described from the catalpa *(C. bignonioides)* as a distinct "variety" (var. *catalpae-syringifoliae* Sacc.). — Allescher (1903).

Dematiaceae capsularum, ssp. div.

Dry capsules of various species of *Catalpa* show very often greyish, more or less effused patches which, the season being advanced, become usually velvety, blackish or olive. These patches (cp. fig. 1) are produced by different saprotrophic *Dematiaceae* at different seasons and may include a. o. the following forms: *Cladosporium bignoniae, Alternaria alternata, Clasterosporium capsularum,* and *Coniothecium capsularum.* Some common members of the association "*Dematiaceae* capsularum" were observed to have different vitality at the moment they were investigated. Thus, *Cladosporium bignoniae* and *Clasterosporium capsularum* (placed in February on agar together with *Alternaria alternata*) did not germinate at all, while *Alternaria alternata* grew well on. This fact suggests that some members of the above mentioned association are horapolymorphic conidial stages only of one and the same fungus species. All forms in question (except one, *Alternaria alternata,* which is mentioned first in the present paper), are known of capsules of *Catalpa* during a relatively long period. The spores in the material I examined were either aseptate or 2-celled (those of *Cladosporium bignoniae*) or 3- to 4-celled (those of *Clasterosporium capsularum*), or muriformly septate (those of *Alternaria alternata*). The record of another *Dematiaceae,* i. e. *Macrosporium commune* = *Stemphylium botryosum* (the conidial form of *Pleospora herbarum*), as occurring on capsules of *Catalpa,* is very doubtful and based probably on few disjointed conidia of *Alternaria alternata.* — Moesz (1909, p. 235); Oudemans (1923, pp. 725—726); Paclt (1948, p. 41).

68. *Diplodia catalpae* Speg. — Allescher (1901).
69. *Epicoccum neglectum* Desm. — Seymour.
70. *Gloeosporium catalpae* Ell. & Ev. — "List of Diseases".
71. *G. microstromoides* Moesz. — Moesz (1909).
72. *Helminthosporium crustuosum* Schw. — Oudemans (p. 724).
73. *Macrophoma baculum* (Gerard) Berl. & Vogl. — Oudemans (p. 723).
74. *Macrosporium catalpae* Ell. & Mart. — The conidia are rarely produced in chains, whence the synonym *Alternaria*

catalpae (Ell. & Mart.) J. B. Parker. — Clinton; Garman (1912, p. 213); Maneval; Dodge & Rickett (1943, p. 201).

75. *Phoma carpogena* Sacc. & Roum. — According to Saccardo, it forms a life-cycle with the ascigerous fungus *Diaporthe spissa* (cp. above); Allescher, 1901.
76. *Phoma catalpae* (Thm.) Sacc. — Allescher (1901).
77. *Phoma catalpicola* Oud. — Oudemans (p. 725).
78. *Phoma herbarum* West. — Described from capsules (as f. *catalpae-capsularum* Sacc.) and branches (as f. *typica*). — Oudemans (pp. 723—725).
79. *Phyllosticta bacillispora* Kab. et Bub. — Oudemans (p. 724).

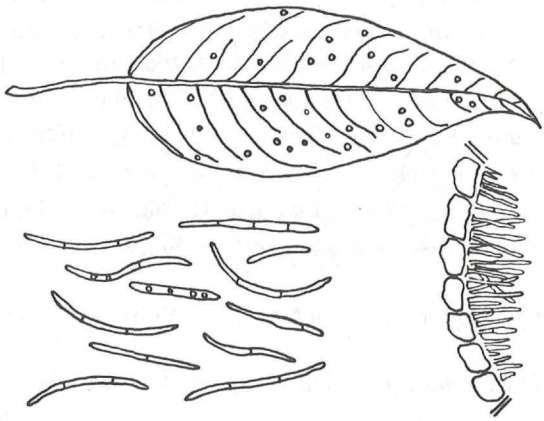

Fig. 2. *Septoria macrocatalpae* sp. nov. Attacked leaf of *C. longissima*, pycnidium and spores. Orig.

80. *Phyllosticta bignoniae* West. — Allescher (1901); Maneval.
81. *Phyllosticta catalpicola* Ell. & Ev. — Allescher (1901); Maneval.
82. *Phyllosticta catalpicola* Oud. — The name (date of publication: 1903) is invalid as it is a later homonym of *P. catalpicola* Ell. & Ev. (= *P. catalpae* Ell. & Mart., 1884), this being a new combination for *Sphaeria catalpicola* Schw., 1831.
83. *Phyllosticta vaga* (Rob.) Allesch. — Allescher (1901).
84. *Septoria catalpae* Sacc. — Allescher (1901).
85. *Septoria macrocatalpae*, sp. nov. (fig, 2). — Maculis ochraceis, fusco-limbatis, ab utraque parte foliorum conspicuis, usque 800 μ diam. Pycnidiis fere 60μ diam., primum epidermide tectis, deinde scutellate patentibus.

Conidiis elongato-bacilliformibus, forma valde variis, aut plus minusve arcuatis, aut subrectis, saepe formae litterae "S" similibus vel alio modo inflectis, interdum multis modis crassescentibus, utrinque attenuatis vel rotundatis, rarius subtruncatis; hyalinis, interdum guttulatis, continuis vel 1—3-septatis, 15—40 μ longis, 1,5—3 μ latis.

Habitat in foliis *Catalpae (Macrocatalpae) longissimae* (Jacq.) ad Kingston, Jamaica, India Occidentalis (X.—XI. 1900 leg. Lehmann); ad Tamboril, Santo Domingo, India Occid. (16. V. 1887, leg. Eggers).

Typus: Lehmann B. T. 591, Rijksherbarium Leiden; s. v. etiam in Herb. Kewensi.

Other material: Eggers 1938, Rijksherbarium Leiden.

86. *Sirodesmium compositum* (Berk. & Rav.) Sacc. — Berkeley (on *C. bignonioides*); Oudemans (p. 726).
87. *Sphaeronema catalpae* Schw. — Oudemans (p. 724).
88. *Torula abbreviata* Corda. — Moesz (1909).
89. *T. olivascens* Schw. — Oudemans (p. 724).
90. *Tubercularia confluens* Corda. — Lindau (1910).
91. *Vermicularia angustata* Schw. — Oudemans (p. 723).
92. *Vermicularia petiolorum* Schw. — Oudemans (p. 723).
93. *Verticillium*, sp. — On *C. speciosa* Boyce.

Appendix.

Other diseases and injuries.

94. Virus diseases. — A reference to a mosaic (undetermined) is to be found in the "List of Diseases". It appeared in Maryland, U.S.A. Whether the horticultural forms *Catalpa bignonioides* f. *variegata* and f. *pulverulenta* themselves may be explained as being caused by a virus has yet to be determined.
95. Bacterial diseases. — Garman (1912, p. 212) suggests to have observed a bacterial disease, the symptom of which is sudden wilting of a portion of the branches of some catalpa (*C. speciosa*) trees growing on lawns. Perhaps, it was a *Verticillium* wilt (cp. no. 93).
96. Deficiency symptoms. — The foliage of the catalpas grown from seed in soil without certain elements varies from pale green to chlorotic (Worley & Lesselbaum & Mathews, on *C. speciosa,* and my own observation on *C. bignonioides*). In

addition, Bremer observed a severe chlorosis of *C. bignonioides* (in cultivation) incidental to the steppe climate of the Ankara district of Turkey.

97. Sun-scorch and drought-injury. — In midsummer some leaves of catalpa trees become brown spotted. Usually the portion midway between the main veins, or the edge of the blade, suffer first (fig. 3).
98. Injuries by frost and hail. — The frost-cracks and similar wounds due to frost are described, in detail, by Massee (1909; 1914, p. 32). The foliage of catalpas is injured often by hail, snow or wind.

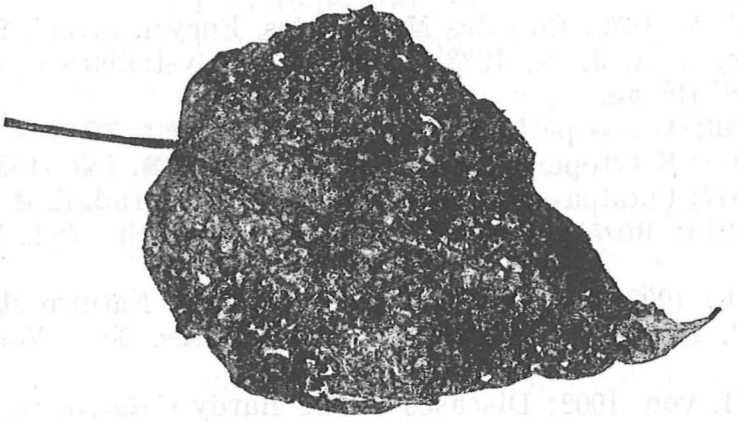

Fig. 3. Sunscorch of *Catalpa bignonioides*. An affected leaf. — $\times$ $^2/_3$ Orig.

99. Shedding of branches. — According to Gager (cp. Massee, 1914, p. 28), the catalpas belong to trees that "annually shed some of their twigs". Massee describes those wounds as "natural wounds, effected by the plant itself for economic reasons".

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