NEW OR INTERESTING TROPICAL AMERICAN DOTHIDEALES—III. (*, **)

CARLOS E. CHARDON

Our knowledge of the group of parasitic fungi of the order Dothideales has been rapidly increasing in the past few years. This is specially true with regards to the tropical American forms, which have been extensively collected and studied by Sydow, Stevens, Seaver, Ciferri and Petrak. Since the writer's second contribution on that order in 1929 (1), the following papers have appeared dealing on that group:

Dr. H. Sydow, the outstanding authority on the order has published a paper (12), in collaboration with Dr. F. Petrak, on the fungi of Costa Rica, based on collections made by professor Alberto M. Brenes. A year later, Sydow published in his "Fungi Venezuelani" (11) the results of his expedition to Venezuela. Petrak and Ciferri, in their "Fungi dominicani" (3), based on collections made by the latter mycologist and by Dr. E. L. Ekman, have also increased our knowledge of this group from Santo Domingo.

Professor F. L. Stevens, of the University of Illinois, an active collector and student of the order has recently published three papers (8, 9, 10), based on his own collections from Costa Rica, British Guiana, Panama, Ecuador and Peru. Finally, the writer, in collaboration with Señor R. A. Toro, published the "Mycological Explorations of Colombia" (2) describing a number of new species from Colombia and Panama.

The number of new species described in these six contributions, plus those described in the present paper, give a sum total of fifty-four, which is relatively large, considering that the Dothideales was up to recent times believed to be a small and unimportant order of fungi. The total number of *Phyllachora* from tropical America reported by Theissen und Sydow in their classical work on the group (13) in 1915 was 322. Since that time, considerable attention has been given to their collecting and study, and the number of known species has been greatly increased.

There seems to be still a wide field for investigation and oppor-

(*) Contribution from the Biology Department, University of Porto Rico, No. 2.

(**) For first paper see Mycologia 19: 295–301. 1927. For second, see Jour. Dept. of Agric., Porto Rico, 13: 3–15. 1929.

tunities in this group for the collector and taxonomist. Cuba, the entire territory of Mexico, Guatemala, Haiti, Jamaica, the Lesser Antilles, the greater portion of the Andean region, the immense Amazon basin, Bolivia and Peru, may still be considered as *terra incognita,* as far as our knowledge of this order is concerned, with only a few scattered collections being reported here and there. The only tropical countries in America whose species are well known are Porto Rico and Costa Rica, and even in these two small countries, as evidenced by the present paper, new species are still to be found. Santo Domingo, certain portions of Colombia, Panama and the coast of Venezuela have also been fairly well studied, but still need considerable exploration.

It is hoped that this contribution may help to keep alive the interest in this important order of plant parasites and stimulate further taxonomical research and exploration. A great deal has yet to be accomplished before we have a comprehensive knowledge of the species of the group.

The writer wishes to express his appreciation to various mycologists and correspondents who have facilitated the progress of this investigation by communicating specimens and portions of type material from the various world herbaria. Among these are: Dr. H. Sydow, of Berlin, who has supplied a number of his types from Costa Rica and Venezuela; Dr. Augusto Scala, director of the Museo de la Plata, Argentine, who has generously mailed for examination the complete set of types of Phyllachora described by the late Dr. Carlos Spegazzini; Dr. John A. Stevenson, in charge of the mycological collections at the Bureau of Plant Industry, Washington, D. C., for sending specimens collected by the late Dr. W. A. Kellermann, by Dr. Paul C. Standley and Mr. H. Schmidt, in Central America; Dr. F. L. Stevens, of the University of Illinois, for supplying portions of type material of his collections from various tropical countries; Dr. Fred J. Seaver, curator of the New York Botanical Garden, for remitting his collections from Trinidad and other undetermined material from the Garden herbarium, and Dr. R. Ciferri, of Moca, Santo Domingo, for sending an interesting collection made by him and by Dr. E. L. Ekman in that neighboring island. Professor H. H. Whetzel has been keenly interested in the progress of our work and made available all the material needed from the herbarium at Cornell University. His cooperation in this work has been a great stimulus and source of inspiration which deserve due acknowledgment. To the various other mycologists who have contributed more limited amounts of material and to the phanerogamists who

have identified the hosts, especially to Dr. N. L. Britton, the writer wishes to express his appreciation.

My laboratory assistants, Miss Josefa Velázquez and Miss Luz M. Vilariño, deserve credit for their help in sectioning the material, making some observations and records of specimens. Thanks are due also to the Rev. Padre Rivera, of Humacao, and to Mr. Rafael A. Toro for the preparation of the latin diagnoses.

The system of classification of the order into families, tribes and genera, given by Theissen und Sydow in "Die Dothideales" (**13**) is followed here, as the best treatment available. The tribal differences in the Phyllachoraceae, especially between the Trabutiineae and Scirrhiineae, based on the subcuticular and subepidermal position of the stromata, though not entirely satisfactory and difficult to follow in practice, is still accepted here.

Family Phyllachoraceae

tribe 1. trabutiineae.

Trabutia Basanacanthae Chardon sp. nov.

Stromata hypophylla subcuticularia, papillata nigra; loculi epidermales; asci paraphysati, clavati cylindracei; sporae distichae v. inordinatae, hyalinae ellipticae.

Stromata hypophyllous, small, about 1 mm. or less in diam., raised above the leaf surface, black, shiny, becoming confluent and forming much larger, concentrically arranged conspicuous stromata, 3–7 mm. in diam. with the surface papillate with numerous protruding necks; the position of the stroma being distinctly subcuticular; locules at first few 1–3, seated on the epidermal layer, with the roof-like clypeus above, flat conical in shape, 200–240 × 125–140 u, later becoming very numerous in the larger, confluent stromata; asci clavate to cylindrical-clavate, 8-spored, 45–54 × 12–14 u, with the spores partially biseriate to inordinate; spores hyaline, 1-celled, long elliptical, 9–12 × 5–6 u; paraphyses present. (Plate XIV, fig. 4)

This is a distinct species, apparently undescribed heretofore and characterized by the large, concentrically arranged stromata resembling those of *Catacaumella Gouaniae* Stevens. The position of the stroma is distinctly subcuticular, being located between the cuticle and the large, conspicuous row of epidermal cells.

On *Basanacantha* sp.

Brasil: Parecy, Bureau Plant Ind. *66619* (coll. J. Rick) 1924 (*type*, communicated by J. A. Stevenson).

Trabutia brasiliensis (Speg.) comb. nov.

Phyllachora brasiliensis Speg., Fungi Arg. **4**: 142.

The type specimen deposited at the Museo de la Plata has been

examined. It consists of only two small leaves and the asci and spores were readily examined and measured; the asci are clavate to subclavate, 67–78 × 22–29 u, with the spores broad ellipsoidal arranged biseriately or inordinate, 14–20 × 9–12 u. Cross sections of the leaves showed the position of the stroma distinctly subcuticular and the species should be removed to *Trabutia*. (Plate XIV, fig. 1)

On Rutaceae, probably *Xanthoxylon*.

BRASIL: Apiahy, Puiggari *1486*, April 1881 (*type*).

TRIBE 2. SCIRRHIINEAE.

Catacauma Serjaniae (Speg.) comb. nov.

Phyllachora Serjaniae Speg. Anal. Mus. Nac. Buenos Aires **23**: 92. 1912.

Characterized by the large, conspicuous, concentric stromata in the epiphyll. The position of the stroma is subepidermal and hence the fungus is a *Catacauma* under Theissen und Sydow's treatment.

On *Serjania caracasana*.

ARGENTINE: Calilegua, Salta, (Museo La Plata Speg. herb *188*) Nov. 1911 (*type*).

Catacauma Amyridis (Seaver) comb. nov.

Phyllachora Amyridis Seaver, Mycologia **20**: 215. 1928.

A microscopical examination of the type material, from Desecheo Island, shows that the stroma is subepidermal and the species falls under *Catacauma* in Teissen & Sydow's keys. It is a beautiful and conspicuous species.

On *Amyris elemifera* L.

PUERTO RICO: Desecheo Island, Britton, Cowell & Hess. *1633*, Feb. 18–19, 1914 (*type*, communicated by F. J. Seaver).

SANTO DOMINGO: Boca del Infierno, Prov. Samaná, Ciferri *4560* (coll. Eckman), June 24, 1930.

According to Seaver (loc. cit.) the species is also known to occur in Cuba, Bahamas, Florida.

Catacauma venezuelensis (Sydow) comb. nov.

Phyllachora venezuelensis Sydow, Ann. Mycol. **28**: 107. 1930.

An examination of the type (no. *830*) shows the epidermal position of the stroma, which makes the fungus fall under *Catacauma*. This is a very conspicuous and beautiful species: The stromata are epiphyllous, black, circular, 2–5 mm. across, with the surface distinctly papillate from the protruding locular necks; spores biseriate or inordinate, rarely uniseriate, ovate to elliptical, 10–18 × 9–14 u. In

the Costa Rican material, the fungus occurs on the pods also. (Plate XV, fig. 1)

On *Machaerium robiniaefolium* (D. C.) Vogel.

VENEZUELA: Puerto La Cruz, Sydow f. exot. exs. *830*, Jan. 6, 1928 (*type*).

On *Mach. Humboldtianum* Vogel.

VENEZUELA: La Victoria, Aragua, Sydow f. exot. exs. *831*, Jan. 27, 1928.

On *Mach. Moritzianum* Benth.

VENEZUELA: Cotiza, near Caracas, Sydow *60*, Dec. 19, 1927.

On *Mach. biovulatum* Micheli.

COSTA RICA: Near San José, Schmidt *CR 47, 52, 54 & 61* (Bureau Plant Ind.) 1928–29 (communicated by J. A. Stevenson).

On *Machaerium* sp.

TRINIDAD: North out to Belle View, Seaver *3142*, Mar. 12, 1921; Gasparee Island, Seaver *3437*, April 27, 1921.

Catacauma Puiggarii (Speg.) comb. nov.

Phyllachora Puiggarii Speg., F. Puigg. no. 319.

A beautiful species with small, shiny stromata. A microscopic examination of the type specimen shows that the stroma is distinctly supepidermal, and hence the fungus is a *Catacauma*. (Plate XIV, fig. 7)

On Leguminosae ("folia parvula imparipinnata").

BRASIL: Apiahy, Sao Paulo, Puiggari *2770* (Museo La Plata Speg. herb. *231*) 1888 (*type*).

Catacauma rimulosa (Speg.) comb. nov.

Phyllachora rimulosa Speg., Bol. Acad. Nac. Ci. Cordoba **23**: 568. 1919.

A distinct conspicuous species apparently common in the vicinity of San José, Costa Rica. The clypeus is sub-epidermal and hence would fall under *Catacauma* in Theissen and Sydow. The stromata are epiphyllous, large, irregular but definite, conspicuous, black shiny, 3–6 mm. across, papillate in the surface due to the minute protruding ostiola; spores uniseriate, elliptical, 14 × 8 u, sometimes bigutulate. In the same stromata are found locules producing linear, fusiform conidia, 5–8 × 1 u, hyaline, 1-celled, born on large filiform sterigmata, 20–25 × 1 u.

In the original Spegazzini specimen, the host is reported as a Myrtaceae. In the publication of the original diagnosis, it is given as "*Eugenia* (costaricensis?)". In the several specimens collected

by R. Schmidt, the host has been determined as *Myrcia Oerstediana* Berg.

On *Myrcia Oerstediana Berg.* (det. P. C. Standley).

COSTA RICA: Near San José, coll. A. Tonduz (Museo La Plata Speg. herb. *177* Dec. 1897, (*type*); near San José, Schmidt *CR 6, 13, 20, 88* & *91* (Bureau Plant Ind.) 1928–29 (communicated by J. A. Stevenson).

Catacauma tropicalis (Speg.) comb. nov.

Phyllachora tropicalis Speg.—F. Argent. III, n. 67.

The stromata in the type specimen, which have been carefully sectioned, show that the clypeus is subepidermal and hence the species belong to *Catacauma*. This character was unknown to Theissen und Sydow (**13**) who never saw the type "original nicht geschen", so they included it as a *Phyllachora*.

On *Psidium Thea.*

ARGENTINE: Cordoba (Museo La Plata Speg. herb. *204*) no date ? (*type*).

PHAEDOTHIOPSIS EUPATORII Stevens, Bot. Gaz. **69**: 252. 1920.

Stevens says with regards to the morphology of this species: "The clypeus is strictly epidermal, and under it very numerous loculi develop, each with an ostiole reaching through the clypeus. The occasional pressing of the perithecia into the mesophyll sometimes gives this the appearance of closer relationship to the Phyllachoriineae, but its relationship is clearly with the Scirrhiineae". This is the first record of the species outside of Porto Rico.

On *Eupatorium portoricense* Urb.

PUERTO RICO: Dos Bocas, below Utuado, Stevens *6866*, Dec. 30, 1913 (*type*).

On *Eupatorium* sp.

HONDURAS: Vicinity of Siguatepeque, Bureau Plant Ind. *56448* (coll. P. C. Standley) Feb. 14–27, 1928 (communicated by J. A. Stevenson).

TRIBE 3. PHYLLACHORIINEAE.

Phyllachora vaginata Chardon sp. nov.

Stromata elliptica v. linearia, sparsa, atra; loculi numerosi globosi; asci paraphysati, cylindracei; sporae octonae, hyalinae, oblique monostichae v. distichae, ellipticae.

Stromata long-elliptical to linear, 1–1.5 mm. × .5 mm., scattered, seldom coalescing; black, conspicuous in the epiphyll, appearing in the hypophyll at first as discolored, slightly raised leaf tissue, with the black stroma appearing later, not surrounded by a conspicuous

zone of dead tissue; locules several (2–4) in each stromata, approximately globose, flask shaped or angular on adjacent sides; asci cylindrical 8-spored, 65–80 × 9–12, with the spores obliquely uniseriate or partially biseriate; spores 1-celled, hyaline, elliptical, 9–12 × 5–6 u; paraphyses present.

The spores of this species agree in shape and measurements with those of *Phyllachora guianensis* Stevens, but it is different in stromatal characters, lacking the characteristic zone of dead host tissue and in other minor characters. Hence the species is apparently new and described as such. The three host grasses are very closely related species.

On *Paspalum vaginatum* Sw.

SANTO DOMINGO: El Jovero, Seibo, Ciferri *4577* (coll. Ekman), July 24, 1930 (*type*).

On *Paspalum distichum* L.

SANTO DOMINGO: Same locality, Ciferri *4604,* (coll. Ekman) July 24, 1930.

On *Paspalum Saugetti* Chase.

SANTO DOMINGO: Cuesta de Piedras, Cordillera septentrional, Prov. Puerto Plata, Ciferri *4803,* Dec. 9, 1930.

PHYLLACHORA CORNISPORA-NECROTICA Chardon, Bol. Real Soc. Esp. Hist. Nat. **28**: 116. 1928.

Phyllachora Paspali Earle in herb.

Most specimens are characterized by the possession of a dead zone of host tissue around the stromata (see plate 1, fig. 1, loc. cit.) but this character is not found in all the specimens. The shape of the spores, however, is distinctive; they have an attenuated appendage in the lower end, similar to the spores of *Phyllachora cornispora* Atkinson.

The species is known to occur in Colombia, Panama and Porto Rico. This is the first report from Guatemala.

On *Paspalum virgatum* L.

GUATEMALA: Los Amates, Dept. Izabal, Bureau Plant Ind. *60868* (coll. W. A. Kellermann), Feb. 15, 1908 (communicated by J. A. Stevenson).

PHYLLACHORA MOLINAE Chardon, Jour. Dept. Agric. Porto Rico **14**: 252. 1930.

This was found to be a common species in the Andean region of Colombia, producing long yellowish spots, and linear rows of stromata 2–5 mm. long (like *Ph. Chaetochloae* Stevens). The fact that

it is also found in Santo Domingo indicates a possible wider geographical distribution.

On *Paspalum paniculatum* L.

SANTO DOMINGO: Estación Agronómica, Haina, Ciferri *4574,* Dec. 12, 1925.

Phyllachora Standleyi Chardon sp. nov.

Stromata amphigena, ad epiphyllum prominulo pustulata in circulum disposita, loculi 1–3 in quoque stromate, saepe circulares; asci paraphysati, cylindracei v. leniter clavulati, sporae monostichae, ovoideae, hyaline, continuae.

Stromata amphigenous, conspicuous, black, not shiny, more visible and pustular in the upper surface of the leaf, roughly circular, not exceeding 1 mm. in diameter, 1–3 loculate, with the locules facing the upper surface and the stroma much more conspicuous above than below, sometimes the black stroma scarcely reaching the hypophyll; locules roughly circular, or angular resulting from lateral pressure, 160–300 × 150–200 u; asci cylindrical-clavate, 8-spored, 80–95 × 10–11 u, with the spores uniseriate; spores 1-celled, hyaline, ovoid, 10–12 × 5–6 u; paraphyses present.

This species has spores resembling those of *Phyllachora Leptochloae* Chardon, but they are ovoid instead of elliptical. The stromatic characters are also peculiar to the species: the hypophyll is very often devoid of the stromatic tissue, but it is found abundantly in the epiphyll. The species is dedicated to its collector Dr. Paul C. Standley, the well known tropical explorer and phanerogamist.

On *Panicum sphaerocarpon* Ell.

HONDURAS: Vicinity of Siguatepeque, Bureau Plant Ind. *56023* (coll. P. C. Standley) Feb. 14, 1923 (*type,* communicated by J. A. Stevenson).

PHYLLACHORA ANTHEPHORAE Sydow, Ann. Mycol. 13: 439. 1915.

The type of this species is from Jamaica (Mayor *350*) and it has been made available by the courtesy of its collector. It is also known to occur in Costa Rica on the authority of Stevens (7). It had not been recorded from Porto Rico, but the following two collections, examined at the New York Botanical Garden agree with the type. It is to be noted that the species has not been found by recent collectors in the island.

On *Anthephora hermaphrodita* (L.) C. Kuntze.

PORTO RICO: "Manati ad Coto *6735* Sintenis Collector" (at N. Y. Bot. Garden); "Santurce Mr. & Mrs. A. A. Heller collectors" (idem).

Phyllachora minima Chardon sp. nov.

Stromata amphigena, punctiformis, sparsa v. saepius laxe gregaria, minuta, nigra 1–2 loculates; loculi ad mesophyllum; asci cylindracei, octonae; sporae monostichae, continuae, hyalinae; paraphysis filiformibus paucis.

Stromata very small, punctiform, scattered or seldom coalescing, black, amphigenous, less than .5 mm. across, 1-loculate or seldom 2-loculate thru coalescence; locule in the mesophyll, stroma brownish black, true Phyllachora-like, surrounded on all sides by stroma, subglobose but slightly angular in the corners, 80–110 × 75–100 u; asci cylindrical, 8-spored, 60–72 × 7–8 u, with the spores uniseriate; spores hyaline, 1-celled, broad elliptical with obtuse end, smooth, 7–9 × 4–5 u, paraphyses filiform, scarce.

The stromata in this species are very small, resembling those of *Phyllachora microspora* Chardon and *Ph. Panici* (Rehm.) Theiss & Sydow. In the former species, the spores are long-elliptical, 5–6 × 4–4.5 u, similar in shape to our specimen, tho a trifle smaller. *Ph. Panici* occurs on *Panicum* and is known only from the type locality from Rio Janeiro. *Ph. Bouteloуae* Rehm. and *Ph. bouteloуicola* Speg. occurring on *Bouteloua* in Argentine, have larger spores. Apparently the species is new to science.

Bouteloua heterostega (Trin.) Griff.

PUERTO RICO: Near Reform School, Mayagüez, Chardon *3204*, Dec. 6, 1931 (*type*).

PHYLLACHORA CLORIDICOLA Speg., Anal. Mus. Nac. Buenos Aires III, 12:416. 1909.

The type species is reported on *Chloris radiata* from La Rioja, Argentine. It has not been made available to the writer, but the other known Argentine specimen has been examined and agrees well with the published diagnosis. The Venezuelan material has asci and spores of the same shape and measurements, but the position of the stroma is different, since it is always amphigenous, and not restricted to the epiphyll. The occurrence of this species in Venezuela, suggests a wider geographical range.

On *Chloris radiata* (L.) Sw.

ARGENTINE: La Rioja (coll. Speg. ?) Dec. 1904 (*type* not seen).

VENEZUELA: near Ocumare, Toro *59*, Dec. 1930.

On *Chloris* sp.

ARGENTINE: Juarez Celman, Cordoba (Museo La Plata Speg. herb. *252*) Jan. 5, 1930.

Phyllachora Leersiae Chardon sp. nov.

Stromata amphigena, nigra minute punctiformis, sparsa, linearibus disposita, loculi solitari, utrimque planissima lenticulares ad mesophyllum immersi; asci paraphysati, cylindracei-clavati, octoni; sporae inordinatae v. monostichae, hyalinae, continuae, elliptico-subfusoideae, utrimque subacutiusculae.

Stromata amphigenous, black, small, punctiform, about .5 mm. across, scattered or in groups with a linear arrangement, inconspicuous; locule single, 200–250 × 120–135 u, flat lenticular or oblong, located in the mesophyll, with black stroma on all sides; asci cylindrical-clavate, 8-spored, 54–60 × 12–14 u, with the spores biseriate or inordinate; spores hyaline, 1-celled, long elliptical to navicular, with ends subacute, 16–19 × 6–7 u; paraphyses present.

This is apparently a new species on a genus of Gramineae not previously known to have been parasitized by a *Phyllachora*. The navicular spores, inordinately arranged in the subclavate asci are characteristic.

On *Leersia* sp., aff. *monandra* Sw.

SANTO DOMINGO: Road to San José de las Matas, Prov. Santiago, Ciferri *4557*, July 12, 1931 (*type*).

Phyllachora Leptochloae Chardon sp. nov.

Stromata amphigena, nigra pallescens, 2–3 loculatae ad mesophyllum immersae; loculi globosi; asci paraphysati, cylindracei-clavati; sporae saepius oblique monostichae, ellipticae, continuae, hyalinae; stylosporis granularibus, viridis.

Stromata amphigenous, conspicuous, black, not shiny, equally visible on both sides of the leaf, roughly circular but tending to be elongate and parallel to the long axis of the leaf, 2–3 loculate with the stroma in the mesophyll; locules nearly globose, 200–250 × 150–200 u; asci cylindrical clavate, 8-spored, 85–100 × 10 u, with the spores obliquely uniseriate; spores 1-celled, hyaline, smooth, navicular, 12–15 × 5–7 u, stylospores present, 12–16 × 3 u, granular and with light greenish contents, paraphyses present.

The stromata are characteristic of the graminicolous *Phyllachorae*, black, conspicuous, not shiny, visible on both sides of the leaf; the locules (2 to 3) are approximately globose or completely immersed in the mesophyll and surrounded on all sides by the black stromatic tissue. No species is reported by Theissen und Sydow (**13**) nor in subsequent works on tropical America, on *Leptochloa*.

On *Leptochloa virgata* (L.) Beauv.

HONDURAS: La Fragua, Bureau Plant Ind. *55759* (coll. P. C. Standley) Feb. 7, 1928 (*type*, communicated by J. A. Stevenson).

PHYLLACHORA CHAETOCHLOAE Stevens, Ill. Biol. Monog. 83: 19. 1923.

Ciferri's specimen from Santo Domingo agrees very well with the type from Trinidad (Stevens *882*) in ascospore shape and dimensions, as well as in the possession of two distinct types of conidia. Seaver's collection from Trinidad appears to be the same.

On *Chaetochloa setosa* (Sw.) Scrib.

SANTO DOMINGO: Santiago, flats near Yaque river, Ciferri & Ekman *no number*, Dec. 1930.

On *Chaetochloa* sp.

TRINIDAD: Heights of Aripo, Seaver *3237*, Mar. 16, 1921.

PHYLLACHORA ANTIOQUENSIS Chardon, Bol. Real Soc. Esp. Hist. Nat. 28: 118. 1928.

This is one of the most characteristic graminicolous *Phyllachorae* with its conspicuous black stromata covering a large part of the host tissue. The host is a tall grass, seldom showing inflorescence and quite common in waste places in the "tierra templada" of Colombia. These are the first reports outside of Colombia.

On *Imperata contracta* (H. B. K.) Hitch.

SANTO DOMINGO: Sabana de la Mar, Cordillera Central, Prov. Samaná, Ciferri *4555* (coll. Ekman, July 13, 1930).

On *Imperata brasiliensis*.

SANTO DOMINGO: Pimentel savanna, San Fco. de Macoris, Ciferri *4550*, Feb. 1930.

On *Imperata* sp.

TRINIDAD: Piarco Savanna, Seaver *3205*, Mar. 13, 1921.

Phyllachora Sorghastri Chardon sp. nov.

Maculae indeterminatae; stromata amphigena, nigra, linearia; loculi 1–2 lenticulares v. elliptici; asci paraphysati, cylindracei clavati; sporae inordinatae, continuae, hyalinae, ellipticae, obtusiusculae, guttulatae.

Stromata amphigenous, black, linear, 1–3 mm. long × .5–1.0 mm. across, producing slight discolored spots indefinite in outline, locules 1–2, lenticular or elliptical, 160–225 × 100–140 u, surrounded on all sides by black stromata; asci cylindrical-clavate, 8-spored, 90–110 × 16–18 u, with the spores inordinate; spores hyaline, 1-celled, long elliptical, with one end obtuse, 14–16 × 6–8 u, provided with many small oil droplets; paraphyses present.

An apparently new species, on a host not previously known to have been parasitized by a *Phyllachora*. The subclavate asci and inordinate spores are typical.

On *Sorghastrum parviflorum* H. & Ch.

SANTO DOMINGO: Sabana de la Mar, Samaná, Ciferri *4579* (coll. Ekman), July 9, 1930 (*type*).

Phyllachora tetraspora Chardon sp. nov.

Stromata conspicua ad epiphyllum, nigra pallescens, linearia, opaca ad hypophyllum, fusca maculla cincta; loculi 1–2 globosi, extus grosse clypei, intus contextu atro-fuscae; asci paraphysati, clavati, tetraspori, guttulati; sporae inordinatae, hyalinae, continuae, ellipticae, 1-guttulatae.

Stromata conspicuous in the epiphyll, black, not shiny, linear, 2.5 mm. long × .5–1.0 mm. broad, faintly visible in the hypophyll, in the form of brown, ashy spots, wrinckled in its surface; locules 1–2, globose flattened to angular, 150–250 × 120–165 u, with thick clypei on the top, and black-brownish stromatic tissue on the sides and bottom; asci clavate, 54–65 × 12–14 u, 4 spored, provided with numerous, globose, oil droplets, with the spores inordinate; spores hyaline, 1-celled, long-elliptical, 16–19 × 5–7 provided with a small oil droplet; paraphyses present. (Plate XIV, fig. 2)

A species forming conspicuous, black, linear stromata. It is different from other species occurring on the tribe Bambusae, in possessing 4-spored asci. Only known from the type collection.

On *Bambos vulgaris* Schrad.

SANTO DOMINGO: Hato del Yaque, Prov. Santiago, Ciferri *4554*, July 10, 1931 (*type*).

Phyllachora Guaduae Chardon sp. nov.

Stromata amphigena, atra, nitidula, linearia disposita; loculi 1–2 lenticulares, ad mesophyllum immersi; asci paraphysati, cylindracei-clavati, octoni; sporae distichae, continuae, hyalinae, fusoideae utrimque acutae.

Stromata amphigenous, very conspicuous, equally visible on both surfaces of the leaf, black, shiny, 3–4 mm. long × 1 mm. wide, arranged loosely in long linear rows, parallel to the main axis of the leaf, causing yellow longitudinal streaks in the leaves; locules 1–2 in cross section, lenticular or angular on the adjacent sides, 160–200 × 120–150 u, completely immersed in the mesophyll of the leaf, surrounded on all sides by the thick stroma; asci cylindrical, clavate, 8-spored, with the spores biseriate in the main body of the ascus, 70–95 × 12–15 u; spores 1-celled, hyaline, smooth, long fusoid with pointed ends, 16–18 × 6–7 u; paraphyses filiform, inconspicuous.

Differs from *Phyllachora gracilis* Speg., reported on a Bambusaceae from Peribebuy, Brasil, in having slightly smaller spores, and very conspicuous linear stromata over twice as long. The species was erroneously determined by Chardon (2) as *Phyllachora bonariensis* Speg., based on Gaillard's no. *257* from Venezuela, which is deposited at the N. Y. Botanical Garden and appeared determined as such but both are species. It seems to be a common fungus on the well known "guadua".

On *Guadua latifolia* Kunth.

COLOMBIA: Quebrada Sinifana, Antioquia, Chardon *93,* May 25, 1926; Hacienda El Hatico, between Cerrito and Palmira, Chardon & Nolla *346,* May 23, 1929 (*type*); along Quindio river, near Armenia, Chardon *710,* July 14, 1929.

VENEZUELA: Atures "Haut Orenoque", Gaillard *257,* Aug. 1887 (at N. Y. Bot. Garden).

Phyllachora Kyllingae Chardon sp. nov.

Stromata amphigena, in limbo utrimque perspicua, atra, nitidula, ad epiphyllum innata superficialia, ad hypophyllum atra pallescens; loculi bilineares, 5–8; asci paraphysati, cylindracei-clavati, octoni; sporae continuae, hyalinae, fusoideae, acutae, distichae.

Stromata amphigenous, 1–2 mm. long × .5 mm. wide, equally visible from both leaf surfaces, black, shiny and pustular in the epiphyll, dull black and smooth in the hypophyll; fructification compound, made up of 5 to 8 locules all immersed in intense black stroma and arranged in two rows, the upper one with 3–5 angular locules, 150–175 × 65–80 u (a few 250 × 150 u) and a lower row of 2–3 locules smaller in size; asci cylindrical-clavate, 70–85 × 6–7 u, 8-spored; spores 1-celled, hyaline, long navicular, 15–17 × 4–5 u, biseriate in the ascus; paraphyses present. (Plate XIV, fig. 6)

The stromata are characteristic of the graminicolous *Phyllachorae,* slightly raised and shining black in the epiphyll; the stroma is characterized microscopically by possessing two rows of locules. There being apparently no species reported on *Kyllinga,* and the stromatic and spore characters being so distinct and peculiar, it is hereby described as a new species.

On *Kyllinga brevifolia* Rottb.

COSTA RICA: Near San José, H. Schmidt *CR 28* (Bureau Plant Ind.) 1928–29 (*type,* communicated by J. A. Stevenson).

PHYLLACHORA GALACTIAE Earle; Seaver *in* Britton, Bahama Flora: 633. 1920.

Phyllachora Lathyri (Lev.) Theiss. & Sydow *in* Seaver and Chardon, Sci. Surv. Porto Rico 8¹: 52. 1926.

Phyllachora gelatinosa Sydow, Ann. Mycol. 28: 104. 1930.

Phyllachora Bradburyae Stevens (?) in herb.

The type species is from New Providence, Bahamas on *Galactia rudolphoides.* Stevens and Dalbey (6) referred numerous forms collected in Porto Rico on *Galactia striata* and *Bradburya virginiana,* to *Phyllachora Lathyri* (Lev.) Theiss. & Sydow. Chardon (Mycol. 12: 319) referred two collections of Whetzel and Olive on *Galactia* to *Ph. Galactiae* Earle, after confirmation by the late F. S. Earle. On the basis of this divergence of opinion, Seaver and Chardon (5)

referred the species on *Bradburya* to *Ph. Lathyri,* following Stevens, and the species on *Galactia* to *Ph. Galactiae,* following Chardon and Earle.

This reference to two different species appears to be a mistake, since *Ph. Lathyri* is a temperate species occurring on *Lathyrus* in Europe, Asiatic Russia and Central Asia, while the Porto Rican species is strictly tropical. A microscopic reexamination of all the Porto Rican material, both on *Galactia* and *Bradburya* has convinced the writer that they belong to one species, namely *Ph. Galactiae* Earle. The same species was reported by Toro (**14**) from Santo Domingo on *G. striata* and by Chardon and Toro (**2**) from various stations from Colombia on the same host.

Sydow (**11**) has recently described *Ph. gelatinosa* sp. nov. on *Bradburya pubescens* from Venezuela, and the material is very suggestive of *Ph. Galactive* and it is here reduced to synonymy. A specimen recently collected by Toro in Venezuela on *Bradburya* is certainly *Ph. Galactiae,* with spores navicular, biseriate, 18–20 × 5–6 u. A specimen at the N. Y. Botanical Garden, collected by Stevens from Ecuador on *Bradburya* is also identical.

This settles in our judgment the confusion which existed, and *Ph. Lathyrii* is excluded from the flora of tropical America, while *Ph. Galactiae* is now understood in a clearer light and its range greatly extended.

On *Galactia striata* (Jacq.) Urban.

PUERTO RICO: Johnston, *4945;* Stevens, *5644;* Fink, *1661* & *2091;* Whetzel & Olive, *574* & *575;* Chardon, *920, 1528* & *1529;* Whetzel, Kern & Toro, *2582.*

SANTO DOMINGO: Kern & Toro, *213* & *277.*

COLOMBIA: Chardon, *416, 431, 575* & *683.*

On *Galactia dubia* DC.

PUERTO RICO: Woods near sea, Earle *27,* Summer 1903.

On *Bradburya virginiana* (L.) Kuntze.

PUERTO RICO: Stevens, *1887, 4314, 5036* & *5991;* Whetzel & Olive. *651.*

ECUADOR: near Teresita, col. F. L. Stevens no *188,* Oct. 31, 1924 (det. as *Ph. gelatinosa* sp. nov.)

VENEZUELA: near Ocumare, coll. R. A. Toro no. *117,* Dec. 25, 1930.

On *Bradburya Plumieri.*

ECUADOR: near Teresita, Stevens *108,* Oct. 29, 1924 (specimen at N. Y. Botanical Garden labelled *Phyllachora Bradburyae* sp. nov.)

On *Bradburya pubescens.*

VENEZUELA: Puerto La Cruz, Sydow f. exot. exs. *825*, Jan. 1, 1928 (type of *Ph. gelatinosa* sp. nov.)

Phyllachora Chamaefistulae Chardon sp. nov.

Stromata epiphylla, atra, nitidula, errumpentia, sparsa, globosa, matrici immersa 1–2 loculata; loculo globosi ad epiphyllum dehiscenti; asci cylindracei-clavati; sporae distichae, hyalinae, fusoideae, grosse guttulate.

Stromata epiphyllous, black, shiny, slightly raised, scattered, round, about 0.5 to 0.8 or seldom 1 mm. in diameter, rarely hypophyllous, with the stroma clearly occupying the mesophyll of the leaf, with 1–2 locules; locules approximately circular or sometimes slightly irregular, opening in the epiphyll, 190–240 × 140–170 u; asci 8-spored, cylindrical-clavate, 95–110 × 12–14 u with the spores biseriate in the ascus; spores hyaline, 1-celled, long navicular, large, 26–30 × 5–6 with a conspicuous, large oil drop in each spore; paraphyses present.

This is apparently an undescribed species and the first one known on the genus *Chamaesfistula*, although others are known to occur on its closely related genus *Cassia*. The large, navicular, uniguttulate spores are characteristic.

On *Chamaefistula antillana* Britton & Rose.

PUERTO RICO: Mountains above Yauco, Whetzel, Chardon & Toro, *3239*, May 24, 1931 (*type*).

Phyllachora Noblei Chardon sp. nov.

Maculae fuscae, amphigenae, determinatae; stromata globosa pallescens atra; loculi globosi; asci paraphysati, cylindracei clavati; sporae distichae v. inordinatae, hyalinae, fusoideae.

Spots slightly exceeding the stromata in the form of a brownish dead zone, encircling them and about .5 mm. across; stromata approximately circular, black, amphigenous, not shiny, flat, about 5 in diameter, 1–2 loculate: locules globose or slightly flattened on adjacent wide 180–215 × 160–100 u; asci cylindrical-clavate; 8-spored, 65–84 × 10–12 u, with the spores biseriate or inordinate; spores hyaline, 1-celled navicular, or long lemon-shaped, smooth, 14–16 × 8–10 u; paraphyses present. (Plate XIV, fig. 3)

A rare species known from two collections from the limestone hills along the road to Cataño. It is probably extensive with the tertiary limestones of the north coast of Porto Rico, where the host is abundant. Dedicated to Mr. David Noble, enthusiastic geological explorer who accompanied the writer in the expedition in which the type specimen was found.

On *Chiococca alba* (L.) Hitch.

PUERTO RICO: Limestone Hills along Cataño road in Iriarte Farm, Whetzel, Kern & Toro *2796*, June 28, 1924; Hills along the Bayamón–Toad road, Chardon *3512*, Jan. 13, 1932 (*type*).

Phyllachora perplexans Chardon nom. nov.

Catacauma Ocoteae Stevens Bot. Gaz. 69: 251. 1920.

The nomenclature of this species is somewhat perplexing. Stevens described it as a *Catacauma* but evidently he did not make median sections thru the stromata. Careful sectioning has been shown that there are clypei above and below, typically *Phyllachora*-like. The species is thus removed to Phyllachora but the specific name *Ocoteae* is untenable in that genus, since there is *Ph. Ocoteae* P. Henn. from Brasil. Hence a new specific name, *perplexans*, is proposed here.

On *Ocotea leucoxylon* (Sw.) Mez.

PUERTO RICO: Monte Alegrillo, near Maricao, Stevens *732*, Mar. 4, 1913 (*type*).

PHYLLACHORA OCOTEICOLA Stevens & Dalbey Bot. Gaz. 68: 57. 1919.

Ph. Ocoteicola Speg. in herb.

Ph. Ocoteicola var. *costaricensis* Stevens, Illinois Biol. Monog. 11: 37. 1927.

Examining Spegazzini's types, furnished by the Museo de la Plata, a specimen was found on *Ocotea diospyrifolia* from Calilegua, Argentine, which is labelled "*Phyllachora ocoteicola* Speg. n. sp." This name was not published, and the same specimen was referred by Spegazzini to *Ph. Ocoteae* P. Henn. (See Myc. Argent. no. *1450*). The Porto Rican material and the type of *Ph. ocoteicola* Stevens & Dalbey have been examined: the original description has spores "17 × 54 u", which is a gross typographical mistake, and it has been corrected to the actual measurements found, 16–20 × 5–7 u. Stevens new variety *costaricensis*, has been examined: it was based on minor stromatal characters, which were also found in other specimens and the validity of the variety is questioned.

On *Ocotea leucoxylon* (Sw.) Mez.

PUERTO RICO: Monte Alegrillo, Stevens *4768*, Nov. 14, 1913 (*type*); Monte de Oro, Stevens *5969*, Dec. 3, 1913; Finca María, Yauco, Whetzel, Kern & Toro, *2510*, June 18, 1924.

On *Ocotea* sp.

COSTA RICA: Peralta, Stevens *390*, July 12, 1923.

Phyllachora catsbyana Chardon sp. nov.

Stromata amphigena, parva, atra, nitidula, ad epiphyllum errumpentia, loculi singuli, subglobosi; asci paraphysati, cylindracei, octoni; sporae monostichae, hyalinae, continuae, ellipticae.

Stromata amphigenous, small, angular, about 1 mm. across, black shining and raised in the epiphyll, dull black and smooth below; locule single, subglobose, 200–240 × 175–210, with heavy clypeus above, and dull black stromatal tissue on the sides and below; asci cylindrical, 8-spored, 75–85 × 10–11 u, with the spores uniseriate; spores hyaline, 1-celled, long ellipsoidal, 8–11 × 5–6 u, paraphyses present. (Plate XVI, fig. 2)

Apparently a distinct species, with much smaller spores than other *Phyllachorae* known on *Ocotea*. The small, uniloculate stromata are also characteristic.

On *Ocotea catsbyana*.

FLORIDA: Key Large, coll. M. F. Barrus, deposited at Cornell University herb. *19113*, Mar. 20, 1931 (*type*).

Phyllachora Ciferri Chardon sp. nov.

Maculae amphigena, indeterminata 5–10 mm.; stromata amphigena, parvis, punctiformis, nigris nitidulis; loculis singulis, globosis v. lenticularibus, ad mesophyllum immersis; asci clavatis v. saccatis, cotonis; pedicello breviusculo; sporis inordinatis, hyalinis, granularibus, paraphysis filiformibus.

Spots amphigenous, appearing as discolored, indeterminate areas, 5–100 mm. across; stromata amphigenous, small, punctiform, round, .8 to 1 mm. in diameter, black, shiny, prominent, seldom coalescing but occurring in groups of 3–25 in each spot; locule single in each stroma, globose to lenticular, 210–300 × 150–200 u; immersed in the mesophyll with distinct thick black clypei above and below and heavy stroma on the sides; asci clavate or saccate, 8 spored, 60–85 × 16–21 u, with the pedicill short and the spores biseriate or inordinate; spores hyaline, 1-celled, elliptical, 14–16 × 6–9 u, with a distinct wall and granular contents; paraphyses filiform, very scarce or none. (Plate XV, fig. 2)

This species differs from all other known on *Phoebe* in its conspicuous groups of punctiform stromata and also in its spore measurements. The species is dedicated to the well known mycological explorer Dr. Ciferri.

On *Phoebe montana* (Sw.) Griseb.

SANTO DOMINGO: Sanchez, Peninsula de Samana, Ciferri *4173* (coll. Eckman), April 19, 1930 (*type*).

On *Phoebe* sp.

COSTA RICA: San José, Schmidt *CR 2, 71* and *87* (Bureau Plant. Ind.) 1928–29.

Phyllachora consociata Chardon sp. nov.

Praecedentis etiam affinis sporarum ascorumque fabrica praecipue tamen recedens. Asci non cylindraceis v. vix paraphysatis, sporis ellipticis.

Same macroscopic and stromatal characters as *Ph. Ciferri;* asci 8-spores, cylindrical or cylindrical-clavate, 72–85 × 6–9, with the spores obliquely uniseriate, or partially biseriate; spores hyaline, 1-celled, long elliptical, 9–11.5 × 4.5–5 u; paraphyses inconspicuous.

This peculiar species appeared associated on the same spots as the above; the stromatal characters were the same, but asci and spores different, both in shape and size.

On *Phoebe montana* (Sw.) Griseb.

SANTO DOMINGO: Same *type* specimen as above.

PHYLLACHORA SERJANIICOLA Chardon, Mycologia **13**: 293. 1921.

Phyllachora sapindacearum Stevens, Ill. Biol. Mong. **11**: 39. 1927.

This species was previously known to occur from Porto Rico (the type is Chardon no. *923* from Peñuelas) where it is abundant, and also from a single collection by Kern & Toro (no. *143*) from Macoris, Santo Domingo. All of them are on *Serjania polyphylla* (L.) Radlk.

The Venezuelan material has stromata 2–3 loculate, with locules 175–250 u across, asci clavate, 8-spored, with spores mostly uniseriate, but sometimes partially biseriate; spores ellipsoidal, 10–12 × 6–7 u. Compared with the type specimen it appears to be the same.

The type species of *Ph. sapindacearum* Stevens from Panama has been examined and it appears to be the same as the Porto Rican and Venezuelan material above mentioned. The spores are also ellipsoidal mostly uniseriate in the ascus, 10–12 × 6–7 u. It is therefore considered as a synonym. No doubt, the species has a wider distribution in tropical America. It should not be confused with *Ph. insueta* Sydow, on *Serjania,* reported from Costa Rica and Colombia, which is very different in stromatal and spore characters.

On *Serjania polyphylla* Radlk.

PORTO RICO: Peñuelas, Chardon *923,* July 27, 1920 (*type*); Mayagüez, Stevens *1196,* May 4, 1913; Bayamón, Johnston *1151,* Jan. 1, 1914; Peñuelas, Chardon *896,* Aug. 11, 1920; id. Chardon *1530,* July 1921; Coamo Springs, Britton *3457,* Jan. 5, 1922; Playa Sardinera, Fajardo, Chardon *1554,* Apr. 11, 1922; Cayey, Chardon *1555,* Apr. 15, 1922; Vieques Island, Whetzel, Kern & Toro *2641,* July 17, 1924; Ciales Road, W. K. & T. *2639.*

SANTO DOMINGO: Macoris, Kern & Toro *153,* Mar. 10, 1926.

On *Serjania paniculata.*

VENEZUELA: Monte Bello, near Caracas, Toro *58,* Dec. 11, 1930.

On *Serjania mexicana.*

PANAMA: France Field, Canal Zone, Stevens *1327,* Aug. 24, 1923.

Phyllachora Torrubiae Chardon sp. nov.

Maculae amphigena indeterminatae parum manifestae pallescentes; stromata 20–50, gregaria in circulum disposita, atra nitidula; loculi singulares v. 2–3, globosi, asci paraphysati cylindracei v. cylindracei-clavati, longiuscule tenuiterque pedicellati, sporis inordinatis v. distichis, hyalinis, continuis.

Spots large, irregular, in outline, sometimes spreading over a considerable part of the leaf surface, 1–3 or more cms. across, at first yellow green, then becoming much paler, visible on both sides of the leaf; stromata in groups of 20–50 in each spot, concentrically arranged in the center of the spot, individual stromata amphigenous, roughly circular to irregular thru coalescence, 1–1.5 mm. across or more, black, shiny; locule single or sometimes 2–3, globose or flattened, 220–270 × 180–250 u, lined with thread-like hyphae which fade into a brown, pseudostromatic tissue; clypeus prominent, both above 20–30 u or more thick, extending far beyond the locules; asci cylindrical to cylindrical-clavate, 8 spored, long pedicellate, 90–145 × 12–15 u, with the spores disorderly uniseriate or partially biseriate; spores 1-celled, hyaline, broad navicular or lemon shaped, 14–18 × 6–8 u; paraphyses present. (Plate XV, fig. 4)

The species is typical in the concentric arrangement of the stromata within the spots.

On *Torrubia fragrans* (Dum.) Standl.

PUERTO RICO: Ravine near Quebradillas, Barrus & Chardon *3057*, Dec. 3, 1927; Limestone hills at Peñón, near Ponce, Chardon & Toro *3369*, May 7, 1931 (*type*).

Phyllachora huigraense Chardon sp. nov.

Stromata amphigena, parva, atra; loculi singuli, lenticulares v. ellipsoidei; asci paraphysati, clavati, 60–85 × 13–18 u; sporis inordinatis v. distichis.

Stromata amphigenous, small, about .5–1.0 mm. in diameter, black, approximately circular; locule single, lenticular or ellipsoidal, 300–350 × 175–200 u, surrounded on all sides by black stromatic tissue: asci clavate, 8-spored, 60–65 × 13–18 u, with the spores biseriate or inordinate; spores hyaline, 1-celled, subglobose to broad-elliptical, 9–12 × 6–8 u, with contents finely granular; paraphyses present.

There are two species of *Phyllachora* reported on *Buettneria* in the northern Andean region of South America: *Ph. vallecaucana* Chardon, from Colombia, which has larger, multilocular stromata, with elliptical, uniseriate, spores, 8–10 × 4–5 u (see fig. 12, Jour. Dept. Agric. P. R. 14 *p.* 265): and *Ph. Buettneriae* Stevens from Ecuador, with larger, multiloculate stromata, spores oblong, 10–15 × 10 u. From both of these our species seems to differ: in the small, uniloculate stromata, and in the shape and size of asci and spores.

On *Buettneria parviflora*.

ECUADOR: Vicinity of Huigra, J. N. and G. Rose, Explorations of South America *23305*, Aug. 22, 1918 (*type*).

Phyllachora verrucosa Chardon sp. nov.

Stromata in centro elevato infuscata; loculi 2–5 amphigena; globosi, asci paraphysati, cylindracei, octoni; sporis monostichis, hyalinis, continuis, ellipticeis.

Stromata very conspicuous, amphigenous, pustule-like, forming elevated pustules, raised about .5 mm. above the leaf surface, approximately circular, or irregular, 1–2 mm. across, made up of a black, shiny stroma bordered by any equally elevated host tissue; locules 2–5 in each stroma, facing the epiphyll, nearly globose, 250–320 u across, surrounded on all sides by the dense, black, stromatic tissue, on the hypophyll the stroma is usually fertile, much less elevated above the leaf tissue than in the hypohyll but also black and conspicuous; asci cylindrical, 8-spored, 85–100 × 12–15 u, with the spores uniseriate or partially biseriate; spores hyaline, 1-celled, broad elliptical, 10–13 × 7–9 u, smooth; paraphyses present. (Plate XV, fig. 3)

This is a very characteristic species possessing conspicuous black, pustulate stromata. *Phyllachora Whetzelii* Chardon has spores with the same shape and length, but it does not possess the pustule-like stromata. It is quite possible that *verrucosa* is a form of the species *Whetzelii*, the pustule-like stroma being only a host reaction. A specimen from Porto Rico (Fink no *1598*) seems to be the same but no spores were seen.

On *Eugenia buxifolia* (Sw.) Willd.

HAITI: near Cape Haitien, G. V. Nash *956*, Sept. 4, 1903 (*type*).

On *Eugenia* sp.

PUERTO RICO: Dry hill top south of Yauco, Fink *1598*, Dec. 31, 1915.

PHYLLACHORA EUGENIAE Chardon, Mycologia **19**: 300. 1927.

This is a conspicuous and beautiful species occurring on the dry limestone hills of the south coast of Porto Rico, where the host is quite common. It was known by a single specimen collected by F. L. Stevens, but it has recently been recollected by professor H. H. Whetzel and the writer. In Ekman's specimen from Santo Domingo, the stromata differ from Porto Rico material in that they are scarcely visible in the epiphyll, appearing as tan, circular spots; but in the hypohyll, the black, conspicuous spots are characteristic. Spores uniseriate or biseriate ellipsoidal, small, 8–10 × 4–4.5 u. (Plate XVI, fig. 3)

On *Eugenia rhombea* (Berg.) Krug & Urb.

PORTO RICO: Guanica, Stevens *321*, Feb. 3, 1913 (*type*) Limestone hills near Ponce, Whetzel & Chardon *3291*, May 23, 1931.

SANTO DOMINGO: Las Lagunas, Prov. Santiago, Ciferri *4250,* (coll. E. L. Ekman) Nov. 21, 1930.

PHYLLACHORA WINTERI Sacc. & Syd., Syll. Fung. **14**: 673.

Ph. Xanthoxyli Wint. not (Lev.) Cke, Hedwigia **26**: 34. 1887.

Physalospora tijucensis Rehm, Hedwigia **40**: 111. 1901.

Trabutia Xanthoxyli Chardon, Sci. Survey Porto Rico **8**: 55. 1926.

This is a difficult species to understand on account of its confusing nomenclature. *Phyllachora Xanthoxyli* (Lev.) Cooke from Java, the type of which is deposited in the Paris Museum, according to Theissen und Sydow (p. 515) looks the same, but has larger spores, 21–23 × 5–5.5 u. Winter's specific name *Xanthoxyli* is untenable and was changed to *Winteri;* most of the tropical American collections have been referred to this specific name. An examination of the type of *Ph. brasiliensis* Speg. shows asci and spores very much like *Winteri* in shape and measurements but the stromata are scattered and individual, not tending to coalesce.

A cross section thru a typical *Ph. Winteri* generally shows a subcuticular stroma, like a *Trabutia,* but occasionally a few stromata are found extending to the hypophyll and thus the fungus is retained in *Phyllachora.* The species *Trabutia Xanthoxyli* Chardon should be included as a synonym. The species is widely distributed in tropical America.

On *Xanthoxylon* sp.

BRASIL: Sta. Catharina, Rabh. F. europ. *3558* (*type* of *Ph. Winteri*); Tijuca, Rio de Janeiro, Ule *2258* (*type* of *Ph. tijucensis*); Sao Leopoldo, Rick *379,* 1908 (comm. by A. J. Stevenson).

VENEZUELA: Near Ocumare, Toro *115,* Dec. 1930 (occurring with *Ph. applanata*).

COSTA RICA: Near San José, Schmidt *CR 66* & *77* (Bu. Plant Ind.) 1928–29.

On *Xanthoxylon martinicensis* (Lam.) D. C.

PUERTO RICO: Whetzel & Olive *649,* Apr. 19, 1916 (type of *Trabutia Xanthoxyli*).

SANTO DOMINGO: Sánchez, Prov. Samaná, Ciferri *4548* (coll. Ekman), Apr. 19, 1930.

ENDODOTHELLA PICRAMNIAE (Sydow) Theiss & Syd., Ann. Mycol. **13**: 590. 1915.

Dothidella Picramniae Sydow, Ann. Mycol. **11**: 266. 1913.

Phyllachora Picramniae Stevens, Ill. Biol. Monog. **11**: 38. 1927.

The type species has been examined and the 2-celled spores clearly observed in a few asci. Most of the spores, however, are unicellular,

a fact which has brought about confusion among investigators. Stevens' type of *Phyllachora Picramniae,* was examined: the spores are non-septate and it seems to be an immature form of the above. They measure 20–26 × 5–6 u. The species has beautiful, conspicuous, circular stromata. It seems to be common in Costa Rica.

On *Picramnia bonplandiana* Tul.

COSTA RICA: Rio Virilla, Sydow f. exot. exs. *134* (coll. A. Tonduz) Oct. 11, 1912 (*type* of *Dothidella Picramniae* Sydow); Aserri, Stevens *119,* June 26, 1923 (*type* of *Ph. Picramniae* Stev.); near San José, Schmidt *32, 38, 72* & *78* (Bu. Plant Ind.) 1928–29; Vicinity of San Sebastián, south of San José, Bureau of Plant Ind. *49352* (coll. P. C. Standley) Feb. 23, 1926.

Genus SHAERODOTHIS Shear Mycologia **1**: 162. 1909.

Like PHYLLACHORA; spores one-celled, brown; paraphyses brown.

According to Shear (loc. cit.) *Sphaerodothis* was the name proposed by Saccardo and Sydow (**4**) for a subgenus of *Auerswaldia* to include the single species *A. Arengae* Rac. Shear raised it to generic rank to take care of species like Phyllachora having brown spores. Theissen und Sydow (**13**) recognized the genus and include seven species under it; three of which are from Tropical America.

The brown color of the spores, which distinguishes this genus from *Phyllachora* is a variable factor which is difficult to depend upon as a sharp basis for generic differentiation. In *Sph. portoricensis* and *Sph. luquillensis* the change of color of the spores is shown in full process of evolution. In both species, the spores in the young stage are large, hyaline to bluish, and full of granular contents and oil drops; in maturity they shrink to a smaller size (see spore measurements in the diagnosis of both species) and change to an olive brown color.

Occasionally, spores of true *Phyllachora* exhibit a few spores which are faintly brownish. Such is the case reported by Stevens (**7**) in *Phyllachora Scleriae* and *Ph. sphaerosperma,* which he changes as new combinations to *Sphaerodothis.* The writer has examined carefully many specimens of these from various countries and he has not been able to find a single spore which is distinctly brown. Admitting that a few of them are occasionally brownish, their rarity is such as to have escaped the attention of other mycologists, and both species should probably belong better in *Phyllachora* where they have always been.

Sphaerodothis trinitensis Chardon sp. nov.

Stromata epiphylla, linearia, atra; loculi singulis, lenticularibus, clypei superne; asci paraphysati, clavati, sporis inordinatis, fuscis, continuis.

Stromata epiphyllous, linear, black, 1–2 mm. long × .6–1.0 mm. wide; locule single, lenticular, 200–260 × 60–100 u, with a thick, black clypeus above, and little or no stromatic tissue on the sides or below; asci saccate or clavate, 8-spored, 46–56 × 14–16, with the spores inordinate; spores distinctly brown, 1-celled, long elliptical to navicular, 14–18 × 5–7 u, paraphyses present.

The species is distinctly a *Sphaerodothis* apparently undescribed heretofore.

On *Schizachyrium condensatum*.

TRINIDAD: Seaver *3113*, 1921 (*type*).

Sphaerodothis portoricensis Chardon spec. nov.

Stromata amphigenae, determinatae, atra pallescentes, loculi 1–2, asci paraphysatis, cylindraceis v. clavatis; sporis distichis ellipsoideis.

Stromata amphigenous, conspicuous, equally visible on both surfaces of the leaf, black, not shiny, markedly convex, 2 mm. long × 1 mm. wide, single, surrounded by a distinct zone of yellow tissue, 1 mm. wide on the sides and about 2 mm. long on each end of the stromata, seldom arranged in linear rows and coalescing to form stromata, 3–5 mm. long, and then causing yellow longitudinal streaks; locules 1–2 in cross section, globose or slightly angular on the adjacent sides, 180–250 × 100–135 u, immersed within the stroma and in the mesophyll; asci cylindrical clavate, 8-spored, with the spores biseriate in the main body of the ascus, 90–100 × 16–21 u; spores 1-celled, large at first, long ellipsoidal, 22–26 × 10–12 u, with distinctly granular contents, at maturity reducing in size, navicular, 18–21 × 7–8 u, with uniform olive brown contents; paraphyses present.

This species is close to *Phyllachora Guaduae* Chardon, reported by the writer from Colombia on *Guadua latifolia* Kunth, but falls under *Sphaerodothis* on account of the olive-brown contents of the spores. It is also close to *Sphaerodothis antioquensis* Chardon, on *Arthrostylidium* from Antioquia, Colombia, but differs from it in having a compound fructification, navicular (not elliptical, blunt) spores and contents light olive-brown. The reduction in the size of the spores occur as they approach maturity, and the change which has also been observed for *Sphaerodothis luquillensis* Chardon (1) collected by the writer, on the slopes of the Luquillo Mountains. Stevens no. *4388* collected in Utuado, P. R., on the same host, is also to be referred to this species.

On *Arthrostylidium sarmentosum* Pilger.

PUERTO RICO: Trail from forest cabin to El Yunque, Luquillo Mountains, Chardon *3368,* Mar. 29–30, 1930 (*type*); Utuado, Stevens *4388,* Nov. 8, 1913.

Dictyochorina Chardon gen. nov. (Phyllachoraceae).

Stromata biophila innata, asci paraphysati octospori; sporae triseptatae, muriformiae, hyalinae.

Stromata between the epidermis and the mesophyll; asci cylindrical to cylindrical-clavate, 8-spored; spores 3-septate, with the two central cells sometimes provided with cross-partitions, making the spore muriform, hyaline; paraphyses present. Type species: *Dictyochorina Arundinellae* sp. nov.

This genus is erected to take care of the species like *Dictyochorella,* having muriform, hyaline spores. In this latter genus, the spores are muriform, brown. No genus is known to receive the species with hyaline spores and the necessity for its erection is necessary to take care of the two species described below.

Dictyochorina Arundinellae Chardon sp. nov.

Stromata amphigena, parva, atra, convexula linearia; loculi sat numerosi irregulares, asci paraphysati, cylindracei clavati, octoni; sporis inordinatis, triseptatis, muriformibus.

Stromata small, black, slightly raised in the epiphyll, much less visible and flat in the undersurface, linear, about .5 to .8 mm. long and much less so in width, arranged in linear groups of 15–40 stromata, about 1.0–1.5 cm. long and 2–3 mm. wide, which makes them conspicuous, each small stromata unilocular, but by frequent coalescence appearing multilocular; locules flat globose, or angular thru pressure, with heavy black clypeus bordering its top and much less so on the sides 160–260 × 100–180 u; asci cylindrical-clavate, 8-spored, 68–85 × 10–14 u, with the spores inordinate; spores long ellipsoidal, 17–21 × 6–8 u; muriform, hyaline, with 3 septae and the two central cells subdivided transversely by cross partitions; paraphyses present. (Plate XVI, fig. 1)

On *Arundinella martinicensis* Griseb.

PUERTO RICO: Hacienda Miramontes, Cidra, Chardon *1716,* Feb. 15, 1931 (*type*) Mayagüez, Whetzel & Olive *553,* Mar. 7, 1916.

GUATEMALA: Los Amates, Dept. Izabal, Bureau Plant Ind. *60867* (coll. W. A. Kellermann), Mar. 15, 1905.

The specimen from Guatemala is labelled "on *Imperata contracta*" but this seems to be an error in the host determination. The asci and spores agree with the Porto Rico type, and the host appears to be the same.

Dictyochorina portoricensis Chardon sp. nov.

Stromata amphigena, atra, nitidula, colliculosa; loculli 2–5; asci

apice obtuse rotundati subcrassiuscule tunicati, basi breviter pedicellati, octospori; sporis muriformibus, 4–6 septatis, paraphysis filiformibus.

Stromata amphigenous, approximately circular, about 1.0–1.5 mm. in diameter, black, shiny, not prominent, but with both surfaces slightly rugose with the small ostiola, scattered, not confluent, surrounded by a thin zone of raised, dead host tissue, not over .5 mm. across; locules 2–3 (seldom 5) globose or approximately so, 180–300 × 165–240, immersed in the mesophyll, with heavy black clypei above and below, and stromatic tissue on the sides; asci clavate, 8 spored, 70–81 × 22–27, with short pedicell, ascus wall greatly thickened at the round apex (10–14 u across), muriform, hyaline, tapering on one end, with 4–6 septate and 1–3 cross walls; paraphyses filiform, inconspicuous. (Plate XVI, fig. 4)

This species is evidently Phyllachoraceous in stromatal characters, but the muriform hyaline spores makes it fall under our new genus *Dictyochorina*. It is known only from the type locality.

On *Eugenia axillaris* (Sw.) Willd.

PUERTO RICO: Hacienda Pulgillas, Coamo, Chardon *902*, Aug. 26, 1920 (*type*).

LITERATURE CITED

1. **Chardon, C. E.** New and Interesting Tropical American Dothideales—II. Jour. Dept. Agric. Porto Rico 13: 3–15. 1929.
2. **Chardon, C. E. and R. A. Toro (et al.).** Mycological Explorations of Colombia. Jour. Dept. Agric. Porto Rico 14: 195–369. 1930.
3. **Petrak, F. und R. Ciferri.** Fungi dominicani. Ann. Mycol. 28: 377–420. 1930.
4. **Saccardo, P. A. et H. Sydow** *in* Saccardo's Sylloge Fungorum 16: 625. 1902.
5. **Seaver, F. J. and C. E. Chardon (et al.).** Mycology. Sci. Survey Porto Rico and Virgin Ids 8, pt. 1: 1–208. 1926.
6. **Stevens, F. L. and N. Dalbey.** Some Phyllachoras from Puerto Rico. Bot. Gaz. 68: 222–225. 1919.
7. **Stevens, F. L.** Fungi from Costa Rica and Panama. Illinois Biol. Monog. 11, No. 2: 1–68. 1927.
8. **Stevens, F. L.** Parasitic fungi from Panama. Ann. Mycol. 28: 281–286. 1930.
9. **Stevens, F. L.** Parasitic fungi from British Guiana, Trinidad, and Costa Rica. Ann. Mycol. 28: 364–371. 1930.
10. **Stevens, F. L.** Parasitic fungi of Peru and Ecuador. Ann. Mycol. 29: 102–106. 1931.
11. **Sydow, H.** Fungi venezuelani. Ann. Mycol. 28: 29–224. 1930.
12. **Sydow, H. et F. Petrak.** Fungi costaricensis a cl. Prof. Alberto M. Brenes collecti. Ann. Mycol. 27: 1–86. 1929.
13. **Theissen, S. J. und H. Sydow.** Die Dothideales. Ann. Mycol. 13: 149–746. 1915.
14. **Toro, R. A.** Fungi of Santo Domingo—I. Mycologia 19: 66–85. 1927.

Explanation of Plates

PLATE XIV

(All photographs reduced to two thirds natural size)

Fig. 1. *Trabutia brasiliensis* (Speg.) Chardon, a portion of Spegazzini's type. Puiggari No. *1488* from Apiahy, Brasil.

Fig. 2. *Phyllachora tetraspora* Chardon, a portion of type, Ciferri No. *4554*, from Hato del Yaque, Santo Domingo.

Fig. 3. *Phyllachora Noblei* Chardon, leaves from Chardon *3512*, Bayamón–Toa road, Porto Rico.

Fig. 4. *Trabutia Basanacanthae* Chardon, type coll. by Rick, Bureau Plant Ind. *66619*, Parecy, Brasil.

Fig. 6. *Catacauma Puiggarii* (Speg.) (Chardon, portion of Spegazzini's type. Puiggari *2770* from Apiahy, Brasil.

Fig. 7. *Phyllachora Kyllingae* Chardon, Schmidt *CR 28*, San José, Costa Rica (type).

PLATE XV

Fig. 1. *Catacauma venezuelensis* (Sydow) Chardon, portion of type, Sydow *830*, Puerto La Cruz, Venezuela.

Fig. 2. *Phyllachora Ciferri* Chardon, portion of type, Ciferri *4173*, coll. Ekman, Sanchez, Santo Domingo.

Fig. 3. *Phyllachora verrucosa* Chardon, portion of type, Nash *956*, Cap Haitien, Haiti.

Fig. 4. *Phyllachora Torrubiae* Chardon, portion of Chardon & Toro *3369*, Ponce, Porto Rico.

PLATE XVI

Fig. 1. *Dictyochorina Arundinellae* Chardon, portion of type, Chardon *1716*, Cidra, Porto Rico.

Fig. 2. *Phyllachora Catsbyanae* Chardon, portion of type, Barrus *19113* (Cornell), Key Largo, Florida.

Fig. 3. *Phyllachora Eugeniae* Chardon, portion of Ciferri No. *4250*, coll. Ekman, Las Lagunas, Santo Domingo.

Fig. 4. *Dictyochorina portoricensis* Chardon, portion of type, Chardon *902*, Coamo, Porto Rico.

PLATE XIV

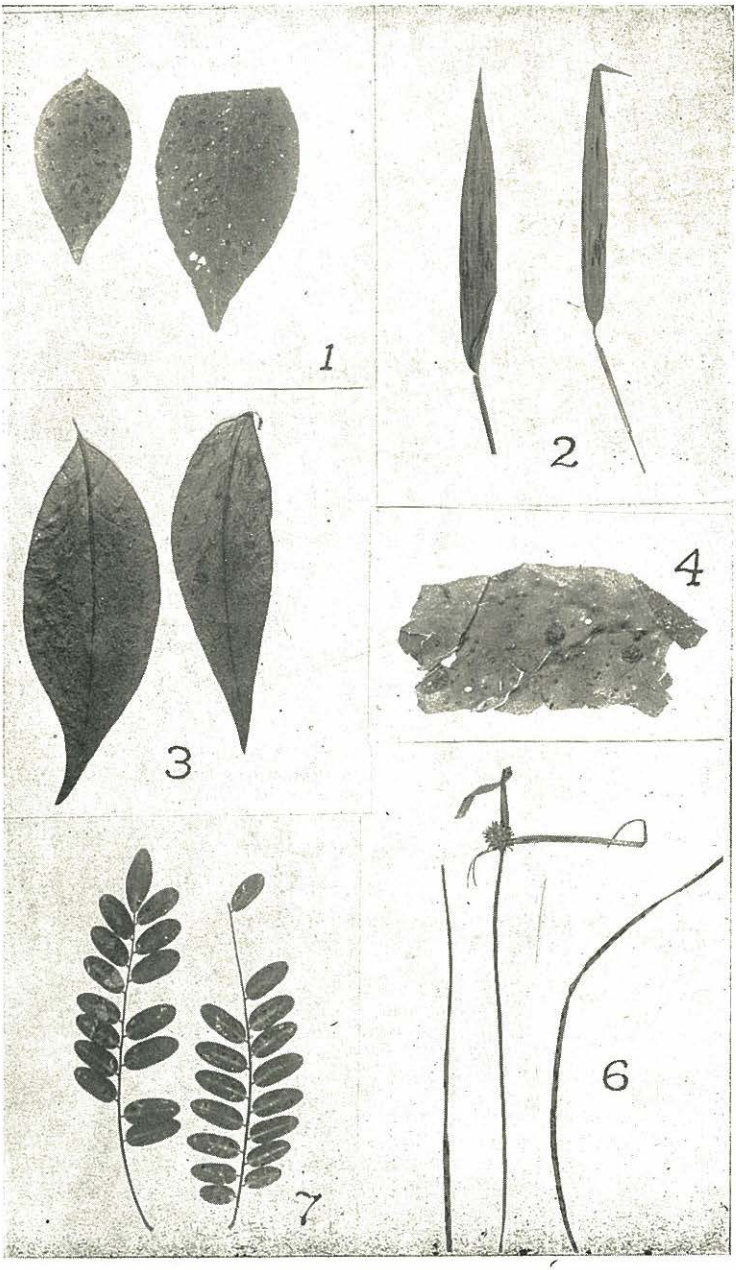

PLATE XV

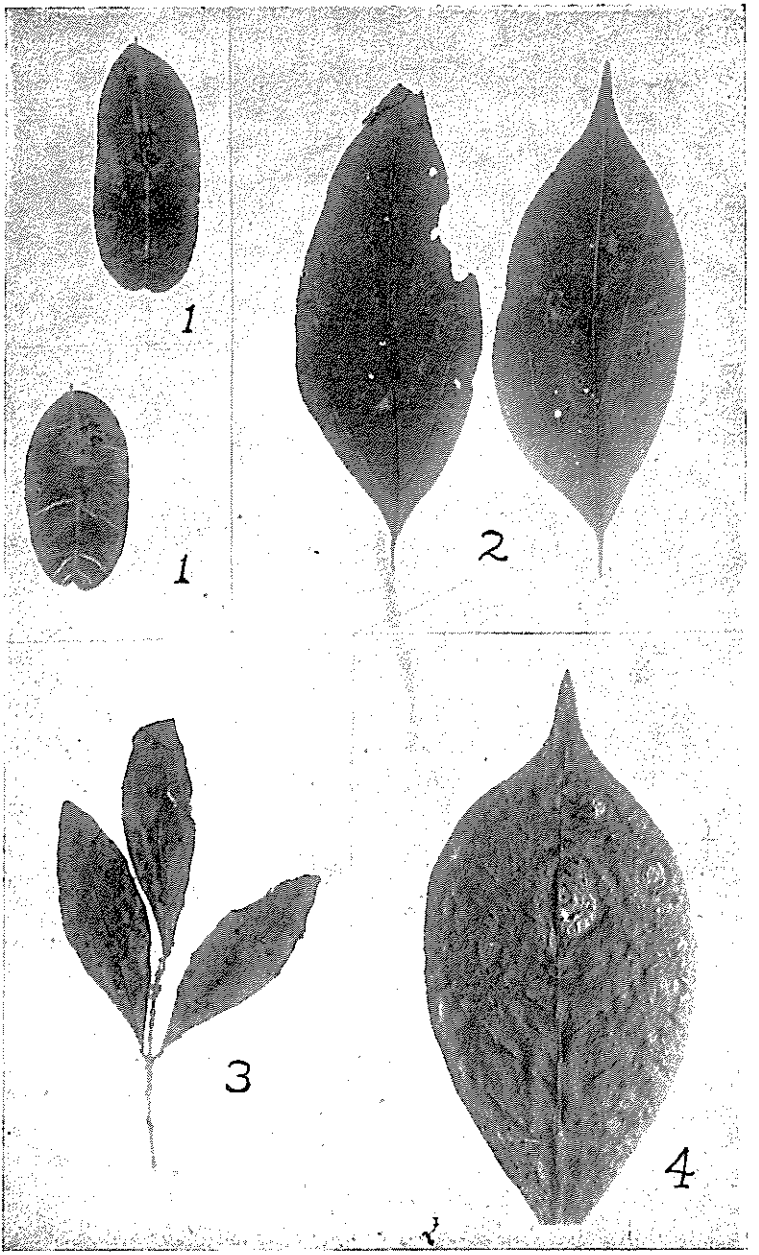

PLATE XVI