

## New Xylariaceae from Hawaii and Texas (USA)

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Four undescribed species of xylariaceous fungi are described here. The following two taxa were collected on the Island of Kauai, Hawaii. *Biscogniauxia viscosicentra* var. *macrospora* differs from the typical variety in the larger size of ascospores. *Nemania kauaiensis* differs from *N. macrocarpa*, also from Hawaii, in its larger ascospores and smaller perithecia. The following two taxa were collected in the Big Thicket National Preserve of Texas. *Camillea texensis* highly resembles *C. fossulata*, but differs in its unornamented ascospores and minute ascus apical ring. *Hypoxyton rosieri* differs from *H. fuscum* primarily in the purple pigment extracted in KOH from stromata.

Keywords: *Biscogniauxia*, *Camillea*, *Hypoxyton*, *Nemania*

A previously undescribed variety of *Biscogniauxia viscosicentra* and a new species of *Nemania* were collected on the Hawaiian Island of Kauai by Frank Hay and J. D. Rogers. New species of *Camillea* and *Hypoxyton* were made in Texas by Larissa Vasilyeva and sent to Jack D. Rogers for identification. Descriptions of these new taxa follow herein.

### Materials and Methods

Colonies were initiated from ascospores removed with a sterile needle from hydrated perithecia from which the overlying stromatal tissue had been aseptically removed. Ascospore masses were stabbed into plates of SME agar (Kenerley & Rogers 1976). When colonies developed transfers were made to 2 % Oatmeal agar (OMA) (Difco) or Potato Dextrose + Yeast agar (2 % Difco Potato Dextrose agar with 5 g /L Difco Yeast Extract) (PDYA) in 9 cm plastic Petri plates and incubated at ca. 20 °C under natural daylight/darkness. Twenty ascospores were measured in water using a Reichert brightfield microscope. The range of spore dimensions is given, rounded to the

nearest full or half micrometer, with exceptional dimensions in parentheses. Means and standard deviations of length and width were computed from unrounded measurements. The amyloid reaction of ascus apices in water-mounted material was tested with Melzer's iodine reagent (Stevens 1974). Observations and photomicrography were accomplished with an Olympus differential interference contrast microscope and a Nikon Coolpix 4300 digital camera. Scanning electron microscopy (SEM) was done on *Camillea* ascospores that were sputter-coated with gold under vacuum, then examined with a Hitachi scanning electron microscope. Cultures were deposited at Institute of Plant and Microbial Biology, Academia Sinica, Taipei, Taiwan. Color designations follow Rayner (1970).

#### Taxonomic Part

*Biscogniauxia viscosicentra* J. D. Rogers, San Martín & Y.-M. Ju var. *macrospora* J. D. Rogers & Frank O. Hay, var. nov. – Fig. 1.

**Mycobank no.: MB 511727**

A varietate typical differt in ascosporis 12–15 (appendice exclusa) x 6–7.5 (8)  $\mu$ m.

Differs from the typical variety in the size of ascospores 12–15 (excluding the appendage) x 6–7.5 (8)  $\mu$ m. (mean length 11.98  $\mu$ m, SD  $\pm$  0.97  $\mu$ m, mean width 6.51  $\mu$ m, SD  $\pm$  0.82  $\mu$ m. Appendage 1.5–2  $\mu$ m high x 2.5–3  $\mu$ m wide at base.

Colony on 2 % oatmeal agar at 20 °C and 12 h fluorescent light reaching perimeter of 9 cm Petri plate in 3–5 wk, at first white, felty to slightly lanose, becoming grayish at center, finally becoming dull black overall. Colony surface becoming hard and granular, composed of bramble-like aggregations of dark warty hyphae of variable diameters. Anamorph not observed.

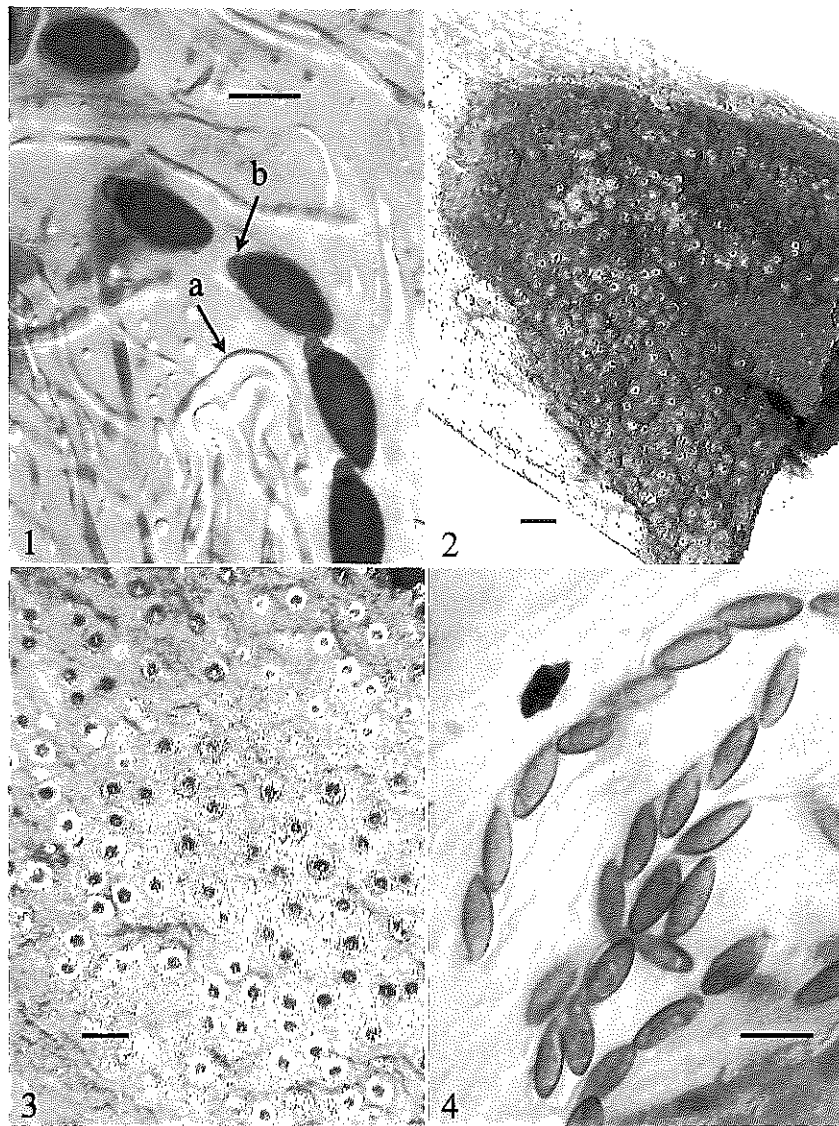
**Eymology.** – For the ascospores that are larger than those of the typical variety.

**Habitat.** – On angiosperm wood.

**Distribution.** – Known only from the type location on Island of Kauai, Hawaii.

**Material examined.** – UNITED STATES, Hawaii, Island of Kauai, Kokee Park, Nualolo Trail, on angiosperm wood, 27 Oct 2007, leg. J. D. Rogers & Frank O. Hay, BISH, holotype; WSP, isotype.

*Biscogniauxia viscosicentra* var. *macrospora* seems identical to the typical variety except in size of ascospores (Rogers *et al.* 2000). Colonies of the two varieties seem identical, except that an anamorph was not seen in var. *macrospora*. The typical variety is known only from Venezuela (Rogers *et al.* 2000). This fungus in both of its varieties, along with *B. citriformis* (Whalley, Hammelev & Taligoola)



Figs. 1-4. *Biscogniauxia viscosicentra* and *Camillea texensis*. 1. *B. viscosicentra*. Hamathecium, with allophyses (arrow a) and ascospore with cellular appendage (arrow b). 2-4. *C. texensis*. 2, 3. Stromatal surface showing ostioles in slightly sunken discs. 4. Ascospores. Scale bars: 1: 8  $\mu$ m; 2: 0.5 mm; 3: 0.2 mm; 4: 8  $\mu$ m.

Van der Gucht & Whalley and var. *macrospora* Vander Gucht & Whalley (Ju *et al.* 1998), are the only taxa described as featuring allophyses (Fig. 1) as well as paraphyses (see Rogers *et al.* 2000 for a description of allophyses). These taxa are unique in that wetting stromata that have been cut to expose perithecial interiors causes the discharge of masses of stringy, sticky material (allophyses) along with ascospores (Fig. 1) that are difficult to remove from the knife. We suspect that neither variety of *B. viscosicentra* is rare, but are basically uncollected because of the infrequent collecting of pyrenomycetes in various tropical locations.

***Camillea texensis*** J. D. Rogers & Lar. N. Vassiljeva, **sp. nov.** – Figs. 2–6.

**MycoBank no.:** MB 511728

A *Camillea fossulata* differt in foveis parietis ascosporae nullis et in annulo apicali asci magnopere deminuto.

Differs from *Camillea fossulata* in lacking pits in the ascospore wall and in the small size of the ascus apical ring.

Stromata appanate, widespreading, <1 mm to 1 mm thick, surface Dark Brick (60) to Brown Vinaceous (84), interior blackish; carbonaceous. Perithecia ca. 0.5 mm diam. Ostioles papillate in uniform slightly sunken discs ca. 0.1 mm diam. (Figs. 2, 3). Asci 8-spored, long-stipitate, 103–118 µm total length x 4.5 µm wide, the spore-bearing part 66–73 µm long, with apical ring bluing in Melzer's iodine reagent, subdiscoid, 0.75 µm high, 1.5 µm wide (Fig. 5). Ascospores subhyaline to greyish or brownish, more or less ellipsoid to somewhat inequilateral with one end often more acute than the other, smooth, (7.5) 9–10.5 x (3) 3.5–4.5 µm (mean length 9.1 µm, SD ± 0.96 µm, mean width 3.7 µm, SD ± 0.59), without germination site (Figs. 4, 6). Paraphyses present. Anamorph unknown.

**Etymology.** – For the state of Texas, the type locality.

**Habitat.** – Wood (?*Carya*)

**Distribution.** – Known only from the type location in Texas.

**Material examined.** – UNITED STATES, Texas, Hardin Co., Big Thicket National Preserve, Lance Rosier Unit, Teel Road, on unidentified angiosperm wood, 06 Oct 2007, leg. Larissa Vasilyeva, WSP, holotype.

The stromatal surface of *C. texensis* has a marked resemblance to *C. fossulata* (Mont.) Laessøe, J. D. Rogers & Whalley (Miller 1961, as *Hypoxyton fossulatum*); San Martín González & Rogers 1993). San Martín González and Rogers (1993) showed the punctuate-reticulate ornamentation of the ascospore walls of *C. fossulata* and its large diamond-shaped iodine-positive ascus apical ring. By contrast, *C. texensis* shows smooth ascospores under SEM (Fig. 6) and a very

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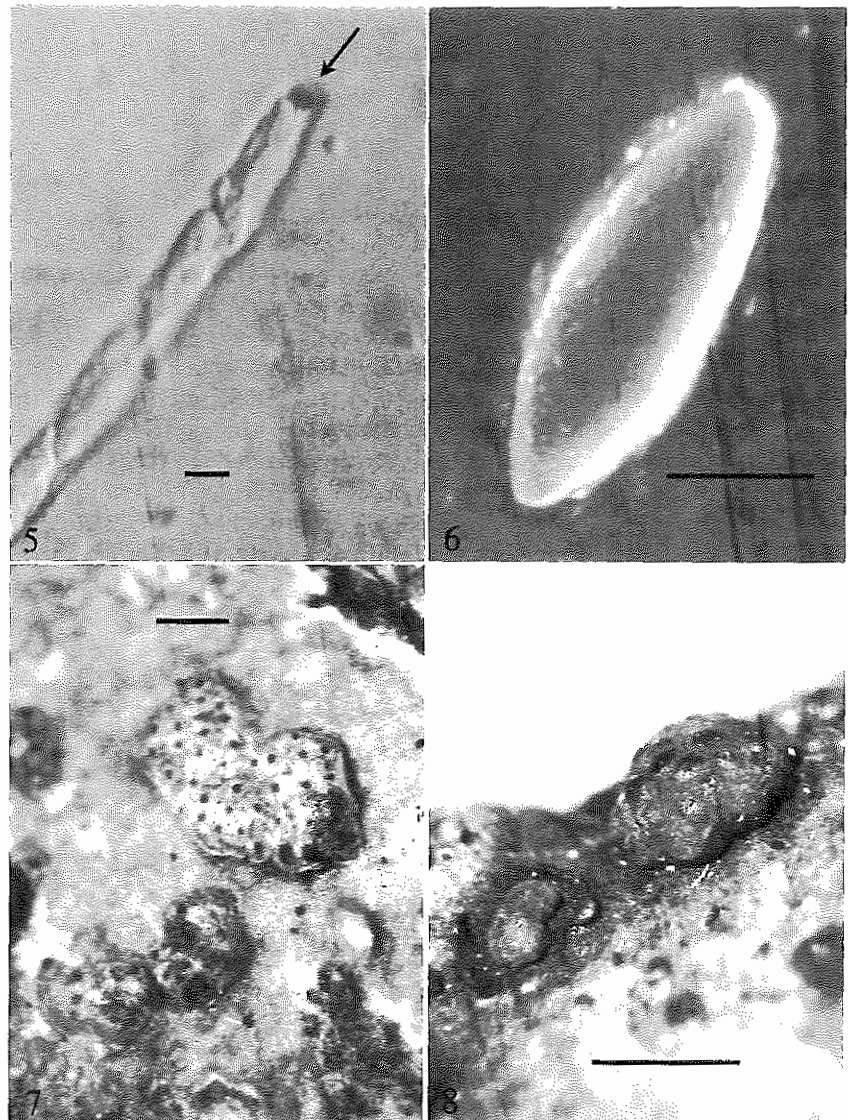
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Figs. 5-8. *Camillea texensis* and *Hypoxylon rosieri*. 5-6. *C. texensis*. 5. Minute, faintly staining ascus apical ring (arrow). 6. Ascospore by SEM. Granular material on spore is from ascus and does not represent roughness on wall. 7, 8. *H. rosieri*. Stromata. Scale bars: 5: 4.5  $\mu$ m; 6: 3.5  $\mu$ m; 7: 0.66 mm; 8: 1.5 mm.

small ascus apical ring that blues weakly in Melzer's iodine reagent (Fig. 5). Neither *C. texensis* nor *C. fossulata* have been cultured.

One might be justified in considering *C. texensis* to be a species of *Biscogniauxia* Kuntze on the basis of its unornamented ascospores and small ascus apical ring. However, no described *Biscogniauxia* species shows the kind of ostiolar discs of the kind featured by *C. texensis* and *C. fossulata*. Unfortunately, neither of these *Camillea* species has been cultured; their anamorphs are unknown. Among *Camillea* species that have been cultured, all show a *Xylocladium* Syd. anamorph (Laessøe *et al.* 1989), whereas among *Biscogniauxia* species that have been cultured, all show a *Nodulisporium* Preuss anamorph (Ju *et al.* 1998). *Camillea* species commonly have ornamented ascospores (Laessøe *et al.* 1989), but several *Biscogniauxia* species likewise have ornamented ascospores (Ju *et al.* 1998). Most *Biscogniauxia* species feature ascospores with germination slits, but *B. arima* San Martín, Y.-M. Ju & J. D. Rogers lacks a germination site. On the other hand, *C. labiatirima* J. D. Rogers, F. San Martín & Y.-M. Ju ascospores feature a germ slit (Rogers *et al.* 2002). Molecular studies reinforce the concept that *Biscogniauxia* and *Camillea* are closely related and could be considered to be congeneric (Sánchez-Ballesteros *et al.* 2000).

***Hypoxylon rosieri*** J. D. Rogers & Lar. N. Vassiljeva, **sp. nov.** – Figs. 7–10.

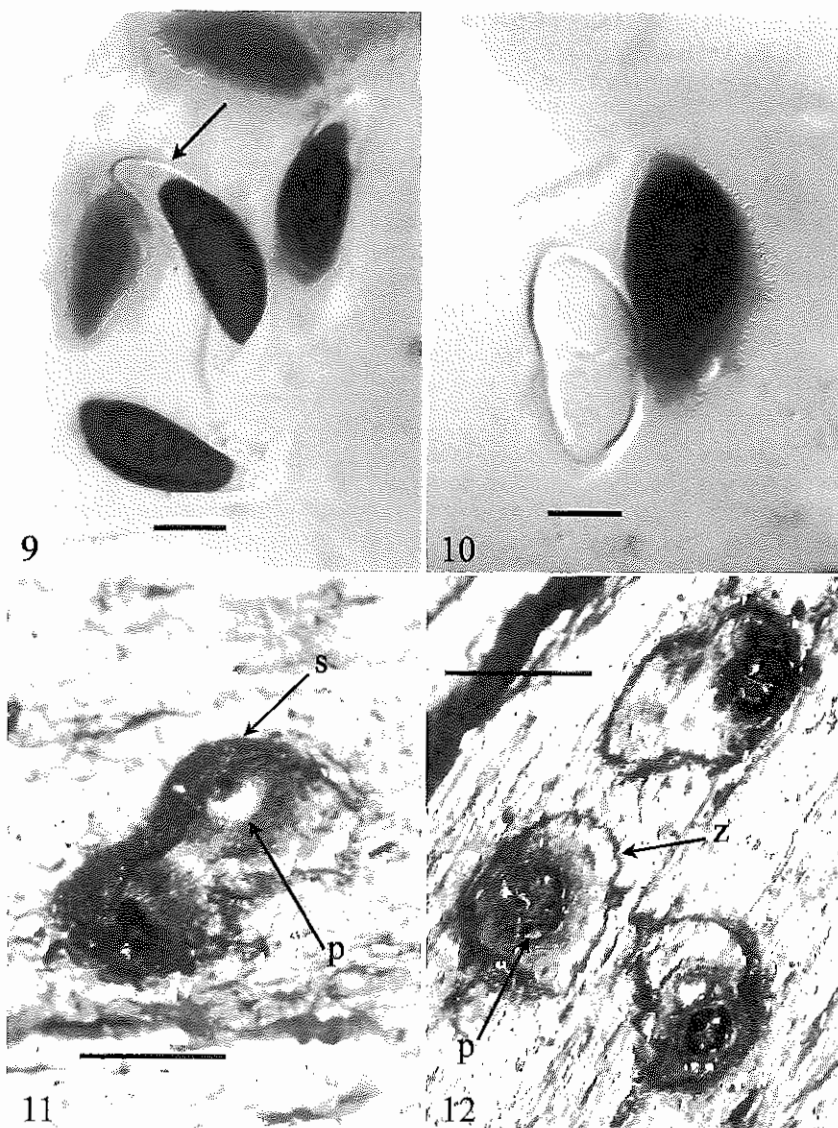
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A hypoxylo fusco differt in colore pigmenti stromatis in KOH dissoluto.

Differs from *Hypoxylon fuscum* in the color of stromatal pigment extracted in KOH.

Stromata pulvinate to hemispheric, with 5–20 perithecia, ca. 2 mm diam or confluent, 1–2 mm thick, with faint perithecial elevations (Figs. 7, 8); surface Brown Vinaceous (84) to Chestnut (40) with yellowish granules beneath surface, with KOH extractable pigments purple or faint. Perithecia obovate, 0.1–0.2 mm diam. Ostioles umbilicate. Ascii 8-spored, ca. 95 µm total length, ca. 6 µm wide, the spore-bearing part ca. 75 µm long, the ascus apical ring bluing in Melzer's iodine reagent, 0.75 µm high, 2 µm wide. Ascospores brown, unicellular, ellipsoid-inequilateral to crescentic, smooth, (10.5) 13.5–15 (17.5) × 5–6 µm (mean length 12.80 µm, SD ± 1.43 µm, mean width 5.63, SD ± 0.41 µm) (Figs. 9, 10) with germination slit more or less spore-length. Perispore dehiscent in 10 % KOH, smooth or minutely rough (Figs. 9, 10). Paraphyses present. Anamorph unknown.

**Etymology.** – In honor of Lance Rosier, naturalist and advocate for Big Thicket National Preserve.



**Figs. 9-12.** *Hypoxylon rosieri* and *Nemanja kauaiensis*. **9, 10. *H. rosieri*. **9.** Ascospore with dehiscing perispore (arrow). **10.** Dehiscing perispore beside ascospore. **11, 12. *N. kauaiensis*. **11.** Two stromata; the stromatal wall (arrow 's') has been partially removed to reveal the underlying perithecium (arrow p). **12.** Horizontal cut of perithecium (arrow p) to expose ascumatal base embedded in decayed wood and showing delimiting zone line (arrow z). Scale bars: 9: 5.4  $\mu$ m; 10: 4.3  $\mu$ m; 11, 12: 1.5 mm.****

Habitat. – Unidentified angiosperm branches.

Distribution. – Known only from type location.

Material examined. – UNITED STATES, Texas, Hardin Co., Big Thicket National Preserve, Lance Rosier Unit, Teel Road, on unidentified angiosperm branches, 6 Oct 2007, leg. Larissa Vasilyeva, WSP, holotype.

*Hypoxyylon rosieri* differs from *H. fuscum* (Pers.:Fr.) Fr. primarily in the purple stromatal pigment extracted in 10% KOH. The latter fungus yields yellowish or greenish pigments in KOH. Unfortunately, cultures were not obtained for *H. rosieri*.

***Nemania kauaiensis*** J. D. Rogers & F. O. Hay, **sp. nov.** – Figs. 11–15.

**MycoBank no.: MB 511729**

A *Nemania macrocarpa* differt in amplitudine ascosporarum et peritheciis et in separatione parietis perithecii et stromatis.

Differs from *Nemania macrocarpa* in size of ascospores and perithecia and in the separation of the perithecial wall from the stroma.

Stromata dome-shaped, 1–1.5 mm diam (Figs. 11, 13), sometimes several confluent, dull black, with 0.1 mm thick wall enclosing 1–several perithecia 0.5–1 mm diam, the perithecia easily removed from the stroma, reminiscent of *Rosellinia* spp. (Fig. 11). Carbonaceous to fragile. Stromatal bases embedded in host tissue and delimited by dark zone lines (Fig. 12). Ostioles finely papillate. Ascii mostly 8-spored, 103–110  $\mu\text{m}$  total length, 8–9  $\mu\text{m}$  wide, the spore-bearing part 70–80  $\mu\text{m}$  long, with apical ring bluing lightly in Melzer's iodine reagent, inversely conical, 2.9  $\mu\text{m}$  high, 2.9  $\mu\text{m}$  wide at apex (Fig. 15). Ascospores nearly black, smooth, ellipsoid-inequilateral to almost equilateral, smooth, 12–13.5 (16)  $\times$  6–7.5  $\mu\text{m}$  (mean length 12.66  $\mu\text{m}$ , SD  $\pm$  1.08  $\mu\text{m}$ , mean width 6.13  $\mu\text{m}$ , SD  $\pm$  0.63  $\mu\text{m}$ ), with germination slit spore-length (Fig. 14). Paraphyses present. Anamorph unknown.

Colony on PDYA at 20 °C and 12 hr fluorescent light growing restrictedly, ca. 3 cm diam in 4 wk, thick, tough with wrinkled surface, white with pinkish areas of exudation, producing diffusing pigment at first Scarlet (5) fading to Brick (59). Reverse immediately beneath colony Chestnut (40).

Colony on SME under identical conditions as above similar to PDYA, but diffusing pigment less intense.

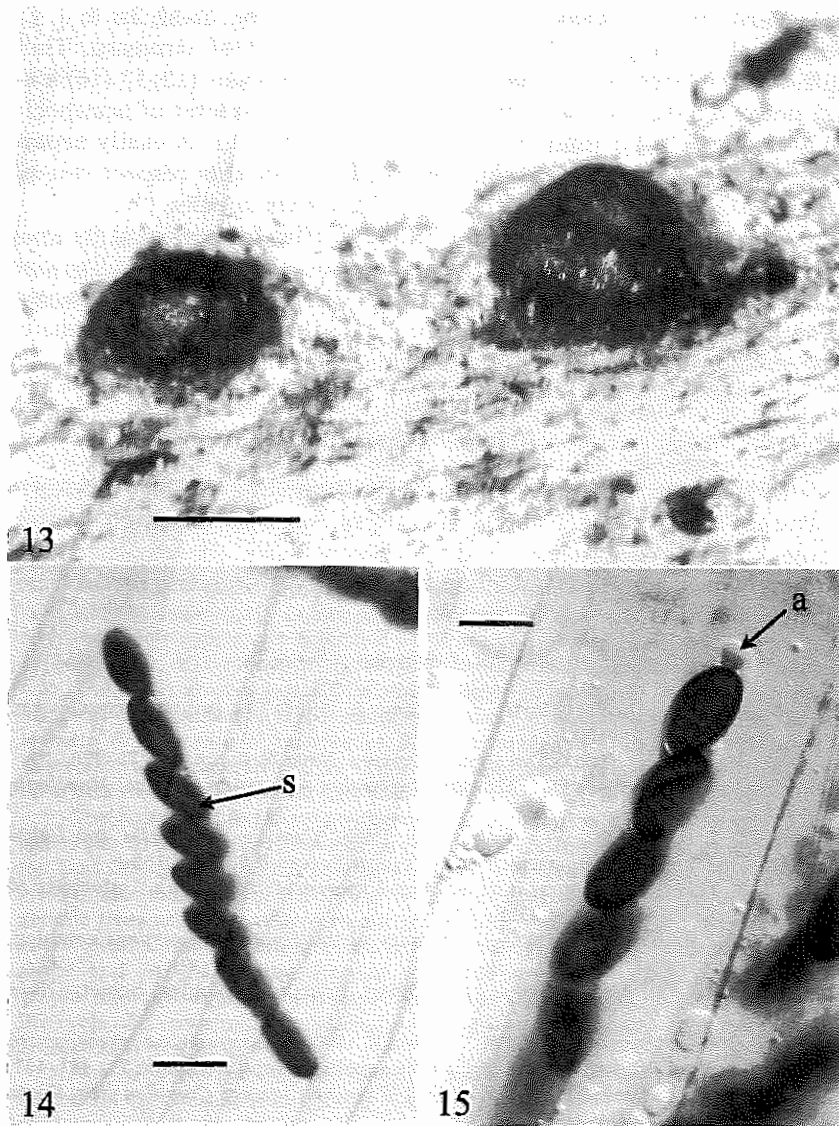
Etymology. – After the Island of Kauai, Hawaii

Habitat. – *Sequoia sempervirens* wood.

Distribution. – Known only from type location.

Material examined. – United States, Hawaii, Island of Kauai, Kokee Park, Berry Flats Trail, on *Sequoia sempervirens* wood, 27 Oct 2007, leg. J. D. Rogers & Frank O. Hay, BISH, holotype; WSP, isotype.





Figs. 13-15. *Nemanium kauaiensis*. 13. Two stromata, the one on the right showing two ostiolar papillae. 14. Ascospores, several showing germination slits, for example at arrow s. 15. Part of ascus with 5 ascospores and faintly blued ascus apical ring (arrows). Scale bars: 13: 1.5 mm; 14: 14  $\mu$ m; 15: 10  $\mu$ m.

*Nemania kauaiensis* resembles *N. macrocarpa* Y.-M. Ju & J. D. Rogers (Ju & Rogers 2002) in the general habit of stromata. They differ in the larger size of ascospores of *N. kauaiensis* [12–13 (16) x 6–7.5 µm vs 8.5–10.5 x 4.5–5 µm] and the smaller diameter of perithecia (0.5–1 mm vs 1–1.5 mm). Moreover, the perithecium is easily separable from the stroma in *N. kauaiensis*, solely in this respect resembling *Rosellinia* spp. rather than other *Nemania* species.

Colonies of *N. kauaiensis* on PDYA differ from most other species of *Nemania* in producing a conspicuous pigment. They likewise differ in their slow restricted growth on SME. Most species of *Nemania* grow rapidly on SME, forming thin colonies that usually become dusty grey with production of conidia (Petrini & Rogers 1986).

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#### References

- Ju Y.-M., Rogers J. D., San Martín F., Granmo A. (1998) The genus *Biscogniauxia*. *Mycotaxon* **66**: 1–98.
- Ju Y.-M., Rogers J. D. (2002) The genus *Nemania*. *Nova Hedwigia* **74**: 75–120.
- Kenerley C. M., Rogers J. D. (1976) On *Hypoxyylon serpens* in culture. *Mycologia* **68**: 688–691.
- Laessøe T., Rogers J. D., Whalley A. J. S. (1989) *Camillea*, *Jongiella* and light-spored species of *Hypoxyylon*. *Mycological Research* **93**: 121–155.
- Miller J. H. (1961) A monograph of the world species of *Hypoxyylon*. University of Georgia Press (Athens, U. S. A.).
- Petrini L. E., Rogers J. D. (1986) A summary of the *Hypoxyylon serpens* complex. *Mycotaxon* **26**: 401–436.
- Rayner R. W. (1970) A mycological colour chart. British Mycological Society (Kew, England).
- Rogers J. D., San Martín F., Ju Y.-M., Hansen K. (2000) *Biscogniauxia viscosicentra* sp. nov. and the anamorph of *Camillea cyclops*. *Nova Hedwigia* **71**: 431–437.
- Rogers J. D., San Martín F., Ju Y.-M. (2002) Three new taxa of *Camillea* from Costa Rica. *Sydowia* **54**: 84–90.
- Sánchez-Ballesteros J., González V., Salazar O., Acero J., Portal MA, Julián M., Rubio V., Bills G. F., Polishook J. D., Platas G., Mochales S., Peláez F. (2000) Phylogenetic study of *Hypoxyylon* and related genera based on ribosomal ITS sequences. *Mycologia* **95**: 964–977.
- San Martín Gonzalez F., Rogers J. D. (1993) *Biscogniauxia* and *Camillea* in Mexico. *Mycotaxon* **47**: 229–258.
- Stevens R. B. (1974). *Mycology Guidebook*. University of Washington Press (Seattle, USA).

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