

# Provisional dichotomic keys for the genera and species of Xylariaceae (Ascomycota) from Tucumán, Argentina

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► **Abstract** — Sir, E. B.; T. C. Perera; A. I. Romero; A. I. Hladki. 2012. "Provisional dichotomic keys for the genera and species of Xylariaceae (Ascomycota) from Tucumán, Argentina". *Lilloa* 49 (2). Dichotomous keys to eleven genera and forty nine species based primarily on collections from «Las Yungas» in Tucumán province, Argentina are presented. The number of each species per genus is presented and expressed graphically in percentages.

**Keywords:** Hipoxylid species, *Kretzschmaria*, *Rosellinia*, *Stilbohypoxylon*, *Xylaria*.

► **Resumen** — Sir, E. B.; T. C. Perera; A. I. Romero; A. I. Hladki. 2012. "Claves dicotómicas provisionales para los géneros y especies de la familia Xylariaceae (Ascomycota) de Tucumán, Argentina". *Lilloa* 49 (2). Se presentan claves dicotómicas para la identificación de 11 géneros y 49 especies de la familia Xylariaceae, colectadas principalmente en «Las Yungas» de la provincia de Tucumán. Se incluye un gráfico del porcentaje de especies en cada género.

**Palabras clave:** Especies hipoxylóides, *Kretzschmaria*, *Rosellinia*, *Stilbohypoxylon*, *Xylaria*.

## INTRODUCTION

There have been very few investigations on the family Xylariaceae in Argentina. The main papers are those by Spegazzini (1880a, b, c, 1881, 1887, 1888, 1898, 1902, 1909, 1912, 1919) and Dennis (1956, 1957, 1958).

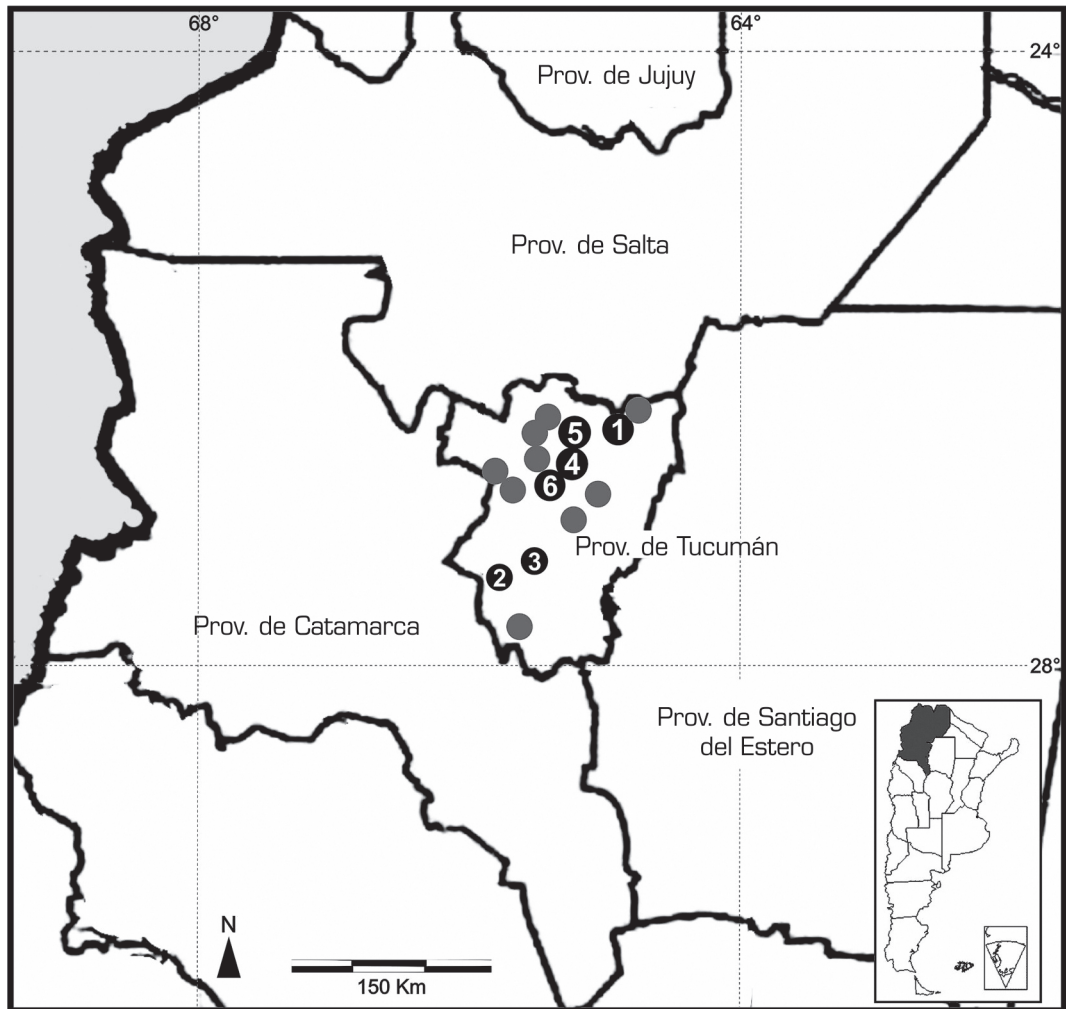
The previous reports from Tucumán consist of 11 species described by Spegazzini (*Hypoxylon nectrioide* Speg., *Rosellinia paraguayensis* Starbäck, *R. smilacina* Speg., *Xylaria arbuscula* Sacc., *X. gomphus* Fr., *X. ianthinovelutina* (Mont.) Fr., *X. macropoda* Speg., *X. smilacicola* Speg., *X. sordida* Speg., *X. torulosa* (Jung.) Speg., *X. venosula* Speg.) and 4 species added by Dennis (*X. grammica* (Mont.) Mont., *X. smilacicola*, *Poronia punctata* (L.) Br., *X. telfairii* (Berk.) Sacc.).

Recently numerous investigations were carried out (Hladki 1997, 2001, 2004, Hladki & Romero 2001, 2003, 2005, 2006, 2007, 2009a, b, 2010, Palacios *et al.* 2008 and Sir *et al.* 2012 a, b *in press*).

The aim of this article is to show the xylariaceous mycobiota from Tucumán, providing dichotomous keys that allow the identification of the genera and species.

## MATERIALS AND METHODS

Information was collected from 15 scientific papers (Hladki 1997, 2001, 2004, Hladki & Romero 2001, 2003, 2005, 2006, 2007, 2009a, b, 2010, Palacios *et al.* 2008 and Sir *et al.* 2012a) from 961 collections (LIL) belonging to different sites of the Tucumán province (Fig. 1); primarily from protected areas: the provincial park "Cochuna", the provincial reservation "La Florida" and



**Fig. 1.** Map Tucumán (Argentina). Sampling sites. 1) Dep. Burruyacú, Sierra de Medina, finca Mansilla, Aguas Negras, km 31 de Villa Padre Monti, 1600 m a.s.l., prov. route 310. 2) Dep. Chicligasta, Provincial Park "The Cochuna", prov. route 331, near camping Samay, 1020 m a.s.l. 3) Dep. Monteros, Reserva Provincial "La Florida", 700 m a.s.l., prov. route 325. 4) Dep. Tafí Viejo, "Biological Park" Sierra de San Javier, road to top of Taficillo near Nina Velardez, site El Balcón, 1090 m a.s.l. 5) Dep. Trancas, La Higuera, Cerro Alto de La Totorá, 1500 m a.s.l. 6) Dep. Yerba Buena, "Biological Park" Sierra de San Javier, Horco Molle, 800 m a.s.l.

Other sites: Dep. Capital, San Miguel de Tucumán, 426 m a.s.l. Dep. Burruyacú, El Timbó, prov. route 311. Dep. Chicligasta, Cuesta El Clavillo. Dep. Cruz Alta, Banda del Río Salí. Dep. Lules, Quebrada de Lules, prov. route 380; *ibid.* Villa Nougés. Dep. Monteros, Toma de la Horqueta, 1050 m a.s.l. Dep. Tafí del Valle, La Heladera, prov. route 307; *ibid.* Infiernillo. Dep. Tafí Viejo, El Siambón, prov. route 340; *ibid.* Raco prov. route 349; *ibid.* San Javier, prov. route 338. Dep. Trancas, Hualinchay; *ibid.* San Pedro de Colalao. Dep. Yerba Buena, Quebrada de Cainzo.

Biological Park "Sierra de San Javier" of the "Yunga" region (Cabrera, 1971)

## RESULTS

### COMPOSITION XYLARIACEOUS MYCOBIOTA IN TUCUMÁN PROVINCE

We recognized the following species of Tucumán province: *Astrocystis smilacicola* (Schwein.) Laessøe & Spooner, *Biscogniauxia capnodes* (Berk.) Y. M. Ju & J. D. Rogers, *Daldinia eschscholzii* (Ehrenb.) Rehm, *Entonaema liquescens* Möller, *Hypoxylon anthochroum* Berk. & Broome, *H. notatum* Berk. & M. A. Curtis, *H. rubiginosum* var. *microsporum* Whalley, *H. subrutulum* Starbäck, *Kretzschmaria argentinensis* Hladki & A. I. Romero, *K. clavus* (Fr.) Sacc., *K. deusta* (Hoffm.) P. M. D. Martin, *K. pavimentosa* (Ces.) P. M. D. Martin, *K. sandvicense* (Reichardt) J. D. Rogers & Y. M. Ju, *K. sigmoidirima* Hladki & A. I. Romero, *Phylacia globosa* Lév., *Poronia oedipus* (Mont.) Mont., *P. punctata* (L.) Fr., *Rosellinia necatrix* Berl. ex Prill., *R. paraguayensis* Speg., *R. subiculata* (Schwein.) Sacc., *Stilbohypoxyton macrosporum* Hladki & A. I. Romero, *S. minus* Hladki & A. I. Romero, *Xylaria adscendens*

Fr., *X. allantoidea* (Berk.) Fr., *X. apiculata* Cooke, *X. coccophora* Mont., *X. cubensis* (Mont.) Fr., *X. culicicephala* A. I. Romero & Hladki, *X. curta* Fr., *X. enteroleuca* (Speg.) P. M. D. Martin, *X. filiformioidea* Hladki & A. I. Romero, *X. fissilis* Ces., *X. globosa* (Spreng. ex Fr.) Mont., *X. gracillima* (Fr.) Fr., *X. grammica*, *X. ianthinovelutina*, *X. aff. ianthinovelutina*, *X. kretzschmarioidea* J. D. Rogers & Rossman, *X. luxurians* (Rehm) Lloyd, *X. melanura* Lév., *X. mellissii* (Berk.) Cooke, *X. microceras* var. *yungae* Hladki & A. I. Romero, *X. multiplex* (Kunze) Fr., *X. myosurus* Mont., *X. pseudoapiculata* Hamme & Guerrero, *X. stilbohypoxyloidea* Hladki & A. I. Romero, *X. telfairii*, *X. tucumanensis* Hladki & A. I. Romero and *X. xylarioides* (Speg.) Hladki & A. I. Romero.

The number of each species per genus is presented and expressed in percentages graphically (Fig. 2). Eleven genera were recognized. If we take only the number of species into account, the best represented genus was *Xylaria*. On the contrary, *Astrocystis*, *Biscogniauxia*, *Daldinia*, *Phylacia* and *Entonaema* were the genera represented by only one species.

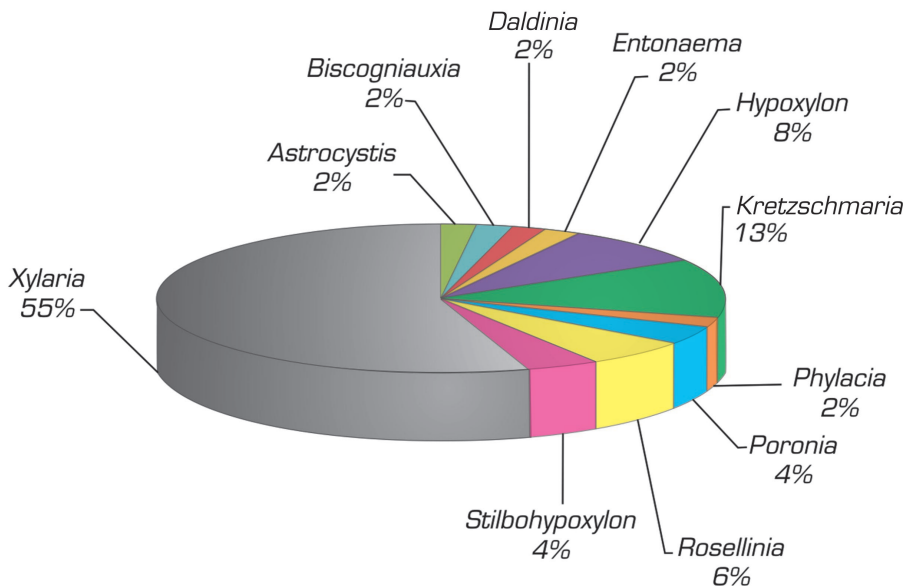


Fig. 2. Genera present in Tucumán and percentage of each species.

*Keys to genera and species studied from Tucumán (super index numbers= bibliographic references of the corresponding description).*

KEYS TO XYLARIACEAE GENUS KNOWN FROM TUCUMAN (ARGENTINA)

- 1 Stromata generally bearing one perithecia ..... 2  
 1' Stromata generally bearing several perithecia ..... 4
- 2 Stromata perithecioid, with 1 or more synnemata borne on immature stromata; *Geniculosporium* like-anamorph ..... *Stilbohypoxyton*<sup>1</sup>  
 2' Stromata without synnemata ..... 3
- 3 Stromata superficial not embedded in the host plant, often with a subiculum; presence of one or few (less than five) perithecia per stroma; *Geniculosporium*, *Dematophora* or *Acanthodochium* like-anamorph ..... *Rosellinia*<sup>2</sup>  
 3' Splitting stromata, small, erumpent, without subiculum, with one or few perithecia ..... *Astrocystis*<sup>2</sup>
- 4 Stromata more or less subglobose and filled with liquid when fresh, becoming hollow when dried; *Nodulisporium* like-anamorph ..... *Entonaema*<sup>4</sup>  
 4' Stromata of various shapes, but never filled with liquid ..... 5
- 5 Stromata subglobose to hemispherical, the interior appearing as concentric ring; *Nodulisporium* like-anamorph ..... *Daldinia*<sup>4</sup>  
 5' Stromata various shapes, but never with concentric rings ..... 6
- 6 Stromata cleistocarpic, ascospore without germination site morphology; *Nodulisporium* like-anamorph ..... *Phylacia*<sup>4</sup>  
 6' Stromata ostiolate; ascospores with pore or germ slit ..... 7
- 7 Stromata bipartite applanate; perithecia embedded in carbonaceous tissue; stromata that do not release colored pigment in KOH; *Nodulisporium* like-anamorph ..... *Biscogniauxia*<sup>5</sup>  
 7' Stromata unipartite, pulvinate, hemispherical, filiform or clavate ..... 8
- 8 Stromata effused pulvinate, attached to the substrate by narrow connectives and easily removed; internally often disintegrating; perithecia often up 0.7 mm long.; *Geniculosporium* like-anamorph ..... *Kretzschmaria*<sup>6</sup>  
 8' Stromata filiform, clavate, pulvinate, stipitate or sessile, the internal tissues often not disintegrat-

- ing; perithecia often less than 0.7 mm long ..... 9
- 9 Stromata pulvinate or applanate pulvinate; ascospores with dehiscent perispore; *Nodulisporium* like-anamorph ..... *Hypoxyton*<sup>3,5,7</sup>  
 9' Stromata of various shapes, but not pulvinate or applanate; often stipitate; ascospores with not dehiscent perispore ..... 10
- 10 Associated with dung; *Lindquistia* like-anamorph ..... *Poronia*<sup>8</sup>  
 10' Associated with wood; other anamorph ..... 11
- 11 Stromata formed on wood fruits or leaves in decomposition and soil; stromata solitary or gregarious; fertile region extremely variable in shape, usually higher than wide; not disintegrated internal tissue at maturity ..... *Xylaria*<sup>9,10,11,12</sup>  
 11' On dicotyledon wood, rarely monocots; densely aggregated, or fused into crust; fertile region wider than high; stromata becoming hollow with age ..... *Kretzschmaria*<sup>6</sup>

KEY TO *BISCOGNAUXIA* AND *HYPOXYLON* SPECIES

- 1 Stromata bipartite, applanate; black surface; carbonaceous internal tissue; without apparent KOH-extractable pigments; ascospores brown or dark brown, ellipsoid, 10.5-13 x 5-6.5 µm, straight and long germ slit, indehiscent perispore; anamorph *Periconiella*-like ..... *Biscogniauxia capnodes*<sup>5,7</sup>  
 1' Stromata unipartite, pulvinate, black surface or bright colors; not carbonaceous internal tissue, with colored granules and KOH-extractable pigments; ascospores with perispore generally dehiscent in KOH; anamorph *Nodulisporium*-like ..... 2
- 2 Stromata with reddish orange, orange, dark orange or orange-brown granules, with KOH extractable pigments orange, reddish, rust, ochreous or brown ..... 3  
 2' Stromata with light brown, dull brown, blackish brown granules; with KOH extractable pigments greenish yellow, dull green, olivaceous, gray olivaceous ..... 4
- 3 Ascospores brown, 7.5-9 x 3.5-5 µm, straight germ slit, with perispore dehiscent in KOH, smooth ..... *H. rubiginosum* var. *microsporium*<sup>13</sup>  
 3' Ascospores brown or dark brown, 9-13 x 5-6.5 µm, slightly sigmoid germ slit, with perispore dehiscent in KOH, with light ring-shaped ornaments ..... *H. lenormandii*<sup>7</sup>
- 4 Apical ring not bluing in Melzer's iodine reagent, very few or absent; ascospores 14.5-15.5 x

- 6.5-8 µm ..... *H. notatum*<sup>5,7</sup>
- 4' Apical ring IK+ disc-shaped, ascospores smaller ..  
..... 5
- 5 Stromata producing olive pigments when in contact with KOH; ascospores brown, with broadly rounded ends, 12-13 x 5-6.5 µm, with conspicuous coil-like ornamentation ..... *H. subrutilum*<sup>7</sup>
- 5' Stromata produced gray olivaceous pigments when in contact with KOH; ascospores brown or dark brown, with narrow rounded ends, 12-14.5 x 5-6.5 µm, with perispore smooth or with faint ornamentation ..... *H. anthochroum*<sup>7</sup>

KEY TO SPECIES OF *KRETZSCHMARIA*

- 1 Stromata stipitate or sessile; individual parts seldom exceeding 1 cm diam, the fertile parts and/or stipes often fused ..... 2
- 1' Stromata more or less sessile, but often attached by rhizoid-like processes or narrow connectives; fertile parts usually exceeding 1 cm diam. .... 4
- 2 Ascospores with a conspicuously sigmoid to spiral germ slit ..... *K. sigmoidirima*<sup>6</sup>
- 2' Ascospores with a straight germ slit shorter than spore length ..... 3
- 3 Ascospores 35-40.5 x 10.5-12 mm, stromata usually stipitate, the fertile part 1-3 mm diam, strongly roughened by scales .....  
..... *K. argentinensis*<sup>6</sup>
- 3' Ascospores 25-30 x 6.5-9 mm, stromata stipitate, the fertile part 2.5-5 mm diam; smooth ..... *K. clavus*<sup>6</sup>
- 4 Ascospores mostly longer than 40 mm .....  
..... *K. pavimentosa*<sup>6</sup>
- 4' Ascospores mostly shorter than 40 mm ..... 5
- 5 Ascospores 26-31.3 x 6.5-7.8 mm, with a germ slit shorter than spore length .... *K. deusta*<sup>6,13</sup>
- 5' Ascospores 32.5-40.3 x 9.1-12 mm, with a germ slit slightly shorter than spore length .....  
..... *K. sandvicensis*<sup>6</sup>

KEY TO SPECIES OF *ROSELLINIA*

- 1 Ascospores 12-14 x 6.5- 8 µm, on *Podocarpus parlatoresi* ..... *R. subiculata*<sup>14</sup>
- 1' Ascospores mostly longer than 30 mm ..... 2
- 2 Ascospores with sigmoid germ slit .....  
..... *R. canzacotoana*<sup>2</sup>
- 2' Ascospores with straight germ slit ..... 3
- 3 Ascospores ellipsoid, 30-38 x 7-7.5 µm, on *Saccharum officinarum* ..... *R. paraguayensis*<sup>2</sup>
- 3' Ascospores fusiform, 30.5-56 x 5-10 µm, on

- many woody and herbaceous plants .....  
..... *R. necatrix*<sup>2</sup>

KEY TO SPECIES OF *STILBOHYPOXYLON*

- 1 Ascospores 23.5-26 x 12-13 µm, with straight germ slit ..... *S. minus*<sup>1</sup>
- 1' Ascospores 30-40 x 12-13 µm, with spiral germ slit ..... *S. macrosporium*<sup>1</sup>

KEY TO SPECIES OF *XYLARIA*

- 1 Stromata formed on leaves or fruits ..... 2
- 1' Stromata formed on wood ..... 3
- 2 On dicotyledons leaves. Stromata filiform, unbranched, fertile part cylindrical sometimes subglobose 1-2.5 x 0.8-2 mm, surface black and bright, with fully exposed perithecial outlines; stipe thin, strap-like or subcylindrical. Ascospores 8-9 x 4-5 µm, germ slit straight, almost spore-length ..... *X. filiformioidea*<sup>11</sup>
- 2' On woody Fabaceae and Bignoniaceae fruits. Stromata strap-like to semi-cylindrical, 10-130 x 1.5-3.5 mm, velvety, with exposed perithecial outlines, rachis hairy ending in a sterile long apex, simple, forked or with more branches. Ascospores 10.5-12 x 4-5 µm, germ slit straight, almost spore-length with hyaline appendages when immature ..... *X. ianthinovelutina*<sup>9</sup>
- 3 Stromata more than 5 mm diam ..... 4
- 3' Stromata less than 5 mm diam ..... 10
- 4 Stromatal surface smooth, thick, hard-textured and without conspicuous perithecial contours, but may have coarse papillate ostioles and/or appressed ectostromatal remnants ..... 5
- 4' Stromatal surface roughened, thin, soft-textured, and/or with conspicuous perithecial contours ..... 7
- 5 Stromatal surface cupreous brown, dark brown to black. Stromata globose to clavate, on short stipes. Ascospores inequilateral with broadly rounded ends, 9.5-10 x 4-5 µm, germ slit straight, inconspicuous to invisible, seldom visible at the straight side of the spore, less than full spore length (4-5 µm) to almost full spore length ..... *X. cubensis*<sup>10</sup>
- 5' Stromatal surface yellowish without any stripes or blackish with remains of ectostroma in longitudinal greyish stripes ..... 6
- 6 Stromata cylindrical to clavate-fusiform, 3-12 x 1-3.5 cm, longitudinally splitting down the middle becoming hollow and curled inwards; surface yellowish to light brown when fresh, with inconspicuous umbilicate to papillate ostioles, entostroma

- ma black. Ascospores inequilaterally ellipsoid to reniform with narrow rounded ends, 21-28.5 x 6.5-8 µm, short oblique or spiral germ slit on the flattened side ..... *X. telfairii*<sup>9</sup>
- 6' Stromata cylindrical to clavate with 2 or 3 constricted regions, 3-9 x 0.7-2 cm, with rounded fertile apex or sometimes sharp sterile apex, surface blackish with longitudinal grey, ectostromatal stripes with small, papillate, ostioles in rows. Ascospores 12-14.5 x 4-6.5 µm, with straight full length germ slit on the flattened side ..... *X. grammica*<sup>10</sup>
- 7 (4) Stromata discoid to flattened conical, attached to the substrate by a basal, short, central reduced stipe; surface roughened with coarse papillate ostioles; perithecia not visible in outline. Ascospores inequilaterally ellipsoid, 8-13 x 5-8 µm, with straight full length germ slit on the flattened side ..... *X. enteroleuca*<sup>12</sup>
- 7' Stromata not flattened or discoid ..... 8
- 8 Stromata extremely variable in shape, generally strawberry-shaped, 2-37 x 2-24 mm with perithecial contours fairly conspicuous; stipe almost absent to 1.5-42 x 1-4.5 mm. Ascospores brown or dark brown, inequilaterally ellipsoid to navicular with narrow rounded end, 22-30 x 8-9.5 µm, with spiral germ slit almost full length (8-9 µm) ..... *X. globosa*<sup>10</sup>
- 8' Stromata cylindrical-clavate, flattened or not; without visible perithecial contours. Ascospores with straight germ slits ..... 9
- 9 Stromata cylindrical to clavate with rounded apex, 7-63 x 2.5-23 mm, surface black, rugose with yellowish brown hexagonal ectostromatal squamules, becoming blackish brown when old. Ascospores inequilaterally ellipsoid to navicular with rounded ends 9-12.5 x 3-4.5 µm, germ slit straight full length on the flattened side ..... *X. curta*<sup>10</sup>
- 9' Stromata generally clavate-flattened with sterile ribbon-like and branched apex, 11-35 x 2-15 mm, stromatal surface cupreous brown, with fragmented reticulate ectostroma, exhibiting the black surface underneath; stipe with pannose base. Ascospores inequilaterally ellipsoid to slightly curved, brown, with rounded ends, 10-13 x 4-5 µm, germ slit conspicuous, straight, almost full length on flattened side ..... *X. ascendens*<sup>10</sup>
- 10(13) Ascospores with spiral or oblique germ slit ..... 11
- 10' Ascospores with straight germ slit ..... 12
- 11 Stromata solitary or gregarious, but never fasciculate, 5-34 x 1-4.5 mm, simple, cylindrical or conical, with inconspicuous perithecial contours, sterile ribbon-like apex, occasionally flabelliform, surface dark brown, with longitudinal ectostromatal stripes of brown tissue. Ascospores inequilateral ellipsoid to navicular with broadly rounded ends, germ slit spiral almost spore-length, 15.5-19 x 5-6.5 µm. Colony on OM black, felty; with numerous sterile, cylindrical, black stromata, 15-24 x 0.5-1 mm, with white branched apex when reaching the top of the Petri dish ..... *X. pseudoapiculata*<sup>10</sup>
- 11' Stromata gregarious, fasciculate, 8-34 x 1.5-2.5 mm, simple or branched, cylindrical, with almost "free" perithecia or sometimes fused, short conical apex, surface dark brown, with yellowish brown ectostromatal at the "perithecial" bases. Ascospores inequilaterally ellipsoid, 22-26 x 6.5-8 µm, germ slit oblique, central, short. Colony on OM black, with whitish margin and occasionally covered by aerial yellowish mycelium, with few filiform, small, 10-13 x 0.4-0.5 mm, sterile stromata ..... *X. luxurians*<sup>10</sup>
- 12 Stromata densely crowded, cerebroid, globose to irregular, 3-7 mm diam, with a "kretzschmarioid" aspect; stipe immersed within the substrate, very reduced or long and strap-like, 5-15 mm long. Ascospores brown, inequilaterally ellipsoid to navicular with narrow rounded ends, 26-32.5 x 8-9 µm, germ slit short, straight or slightly oblique on flattened side ... *X. kretzschmarioidea*<sup>10</sup>
- 12' Stromata without kretzschmarioid aspect ..... 13
- 13 Stromata composed of a very slender, delicate rachis on which a few "naked" perithecia are arranged ..... 14
- 13' Stromata with different stipe and with either partially or totally invisible perithecial outlines ... ..... 17
- 14 Stromata gregarious, with a stilbohypoxyloid aspect; strap-like stipe irregularly branched, generally immersed within the substrate, bearing one naked perithecium and ending in a lateral sterile acicular apex. Ascospores fusiform or inequilaterally ellipsoid, 28-32.5 x 8-9 µm, germ slit slightly oblique full spore -length on flattened side ..... *X. stilbohypoxyloidea*<sup>11</sup>
- 14' Stromata solitary or gregarious; erect cylindrical stipes, 4-23 mm long ..... 15
- 15 Stromata solitary or in small groups, 4-8 x 0.2-0.6 mm, bearing generally one perithecium or no more than three, surface of perithecial outlines shiny black, composed of cells in uniform rows; external tissue and perithecial wall brownish green. Ascus with apical apparatus 6.5-8 x 5-6.5 µm. Ascospores navicular, one end being pinched, brown, 6-30 x 10.5-12 µm, germ slit straight, spore-length on flattened side ..... *X. culicicephala*<sup>11</sup>



- 15' Stromata solitary or gregarious, bearing several perithecia (3-19) ..... 16
- 16 Stromata gregarious, 2-23 x 1-3 mm; surface delicately rugose, black; long acicular sterile apex. Ascospores navicular with rounded ends to inequilaterally ellipsoid, 30-36.5 x 10.5-13 µm, germ slit straight or slightly oblique spore-length on flattened side ..... *X. melanura*<sup>10</sup>
- 16' Stromata solitary, 12-15 x 0.2-0.3 mm, surface of perithecial outlines shiny black, composed of cells in uniform rows, external tissue and perithecial wall brownish green. Ascus with apical apparatus 4.5-5 x 2.5-4 µm. Ascospores navicular, 17-19.5 x 8 µm, straight germ slit, nearly spore-length on flattened side ..... *X. tucumanensis*<sup>10</sup>
- 17(13) Stromata with perithecial outlines ..... 18
- 17' Stromata with perithecial outlines not or slightly visible ..... 20
- 18 Stromata gregarious, generally parallel to the substrate; fertile region ribbon-like to semicylindrical, cupreous brown, hairy with black perithecial, almost free. Stipe ill-defined, ribbon-like or subcylindrical, cupreous brown to violet brown, tomentose overall, wide and pannose base. Ascospores brown, navicular with broadly rounded ends, with hyaline appendages when immature, 10.5-12 x 4-5 µm, germ slit straight, spore-length on flattened side. Colony on DM whitish yellowish, appressed, later zoned with festooned black margin; sterile stromata cylindrical, dichotomous branched in the apex, 18-20 x 1 mm ... *X. aff. ianthino-velutina*<sup>11</sup>
- 18' Stromata gregarious, occasionally caespitose, erected; fertile region cylindrical and glabrous. Ascospores without appendages ..... 19
- 19 Stromata caespitose, generally growing on large fallen trunks without bark, 4-43 x 1-2.5 mm; fertile region dark brown to black, nodulose, with conspicuous perithecial contours, with abundant remains of yellowish brown ectostromatal tissue on "perithecial" bases and on the stipe, becoming totally black when mature; sterile apex yellowish brown, generally conic and short; stipe glabrous with discoid base. Ascospores navicular with broadly rounded ends, 9-13 x 4-5.5 µm, germ slit inconspicuous, straight, spore-length on flattened side ..... *X. coccophora*<sup>10</sup>
- 19' Stromata gregarious, growing on little twigs, erected or parallel to the substrate, 13-40 x 1-1.5 mm; fertile region dark brown to black with conspicuous perithecial contours, with scanty brown remains of ectostroma; sterile apex acute and long, 2-8 mm long; stipe tomentose with wide base. Ascospores inequilaterally ellipsoid or fusiform with narrowly rounded ends, 9-13 x 4-5 µm, germ slit conspicuous, straight almost spore-length on flattened side .... *X. gracillima*<sup>10</sup>
- 20(17) Stromata lanceolate or cylindrical-fusiform with stipe less than 2 mm long ..... 21
- 20' Stromata cylindrical to conical generally with stipe more than 2 mm long ..... 22
- 21 Stromata solitary or in small groups, cylindrical or flattened, 11-24 x 2-3.5 mm; surface dark brown to blackish with abundant remains of yellowish brown ectostroma, perithecial contours inconspicuous, perithecia with minutely papillate ostioles. Ascospores inequilaterally ellipsoid, with broadly rounded ends, 6.5-8 x 4 µm, germ slit straight, slightly less than spore-length on flattened side ..... *X. microceras* var. *yungae*<sup>11</sup>
- 21' Stromata gregarious, lanceolate or flattened, 12-20 x 1.5-2.5 mm; surface opaque black, without visible perithecial contours, with prominent conical shiny black papillae ostioles. Ascospores inequilaterally ellipsoid to navicular with broadly rounded ends, 8-9 x 3.5-5 µm, germ slit straight, inconspicuous, spore-length on flattened side ..... *X. myosurus*<sup>11</sup>
- 22(20) Stromata fasciculate, surface with longitudinal stripes of black ectostroma, becoming hollow at maturity ..... 23
- 22' Stromata solitary or in small groups, surface dark brown with longitudinal stripes of light brown ectostroma ..... 24
- 23 Stromata densely caespitose, 3-22 x 0.5-1 mm, cylindrical, outline undulate or nodulose, apex sterile, acute; surface dark brown to black with tiny, black, papillae ostioles, acute tip; inner tissue light brown, persistent. Ascospores brown, inequilaterally ellipsoid to navicular, with rounded ends, 9.5-12.5 x 4-5 µm, germ slit inconspicuous, straight, slightly less than spore length on flattened side ..... *X. multiplex*<sup>9</sup>
- 23' Stromata laxly fasciculate, 18-25 x 2-4 mm, cylindrical or flattened flabelliform pointing towards the apex, very fragile, perithecial contours inconspicuous, surface dark brown, with prominent conical papillae ostioles; inner tissue dark brown to black, eventually hollow. Ascospores brown, navicular, 14.5-17.5 x 4-7 µm, germ slit straight to slightly oblique almost spore-length on flattened side ..... *X. fissilis*<sup>10</sup>
- 24(22) Stromata subglobose to conical, sessile or with a short stipe less than 3 mm long. Ascospores brown to dark brown, inequilaterally ellipsoid to navicular, 17-21 x 6.5-9 µm, germ slit straight, almost spore length on flattened side ..... *X. xylarioidea*<sup>11</sup>
- 24' Stromata cylindrical, with well-developed stipes ..... 25

- 25 Ascospores brown, inequilaterally ellipsoid to navicular, with narrowly rounded ends, 21-25 x 7.5-8 µm, germ slit straight, almost spore length on flattened side. Colony on OM slow growth (9 cm diam/5 weeks), mycelium greenish black with age; hyphae erect, brown, dark brown and profusely branched apex. Stromata rudimentary, sterile, conical to lobulate, 2-3 x 1-1.5 mm .....  
..... *X. mellissii*<sup>10</sup>
- 25' Ascospores brown, inequilaterally ellipsoid to navicular, with broadly rounded ends, 12-14.5 x 5-6.5 µm, germ slit straight spore length on flattened side. Colony on OM fast growth (9 cm diam/ 2½-3 weeks), mycelium greyish black alternated with white concentric areas, velvety. Hyphae hyaline, thin, unbranched and others dark with many short protuberances. Anamorphic stromata filiform, conidia hyaline, 5-5.5 x 1-1.5 µm .....  
..... *X. arbuscula*<sup>10</sup>

References: <sup>1</sup>Hladki and Romero (2003); <sup>2</sup>Sir *et al.* (2012a); <sup>3</sup>Hladki and Romero (2009b); <sup>4</sup>Hladki (2004); <sup>5</sup>Hladki and Romero (2006); <sup>6</sup>Hladki and Romero (2001); <sup>7</sup>Hladki and Romero (2009a); <sup>8</sup>Hladki (1997); <sup>9</sup>Hladki and Romero (2005); <sup>10</sup>Hladki and Romero (2007); <sup>11</sup>Hladki and Romero (2010); <sup>12</sup>Hladki (2001); <sup>13</sup>Palacios *et al.* (2008); <sup>14</sup>Catania (2009).

#### DISCUSSION AND CONCLUSION

Studies in the past decade have increased the understanding of the biodiversity of Xylariaceae from Argentina. For example there used to be 4 genera and 14 species from Tucumán recognized in the literature. Eleven genera and forty nine species are currently cited.

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