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Gymnopilus palmicola a Lignicolous Basidiomycete, Growing on the Adventitious Roots of the Palm Sabal palmetto in Texas

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Several species of palms are planted in Texas for ornamental purposes; *Sabal palmetto* (Walter) Loddiges ex J. A. & J. H. Schultes is one of the most popular. Almost all plantings of this species are carried out by removal of mature trees (3 m or greater) from natural populations in Florida. Menge and Brown (1992) discuss in detail the transplanting techniques, habitat destruction, and palm losses associated with the removal of this palm species for landscape purposes. Due to the faster seedling growth of *Washingtonia* species, the nursery industry prefers to grow these palms rather than the slower growing *Sabal* species which they transplant from natural stands when needed. Unfortunately many of these *Washingtonia* palms are killed by the brief but severe freezes that coastal Texas experiences (e.g., 1983 and 1989). All of the *Sabal* species tolerate these freezes. The nursery industry should use the more cold-tolerant species of *Sabal* and this species should be grown from seed rather than remove large trees from natural stands in Florida. These palm transplantings result in numerous trees dying as a result of careless practices associated with moving them, prolonged periods in temporary plantings in nurseries, and poor care after planting.

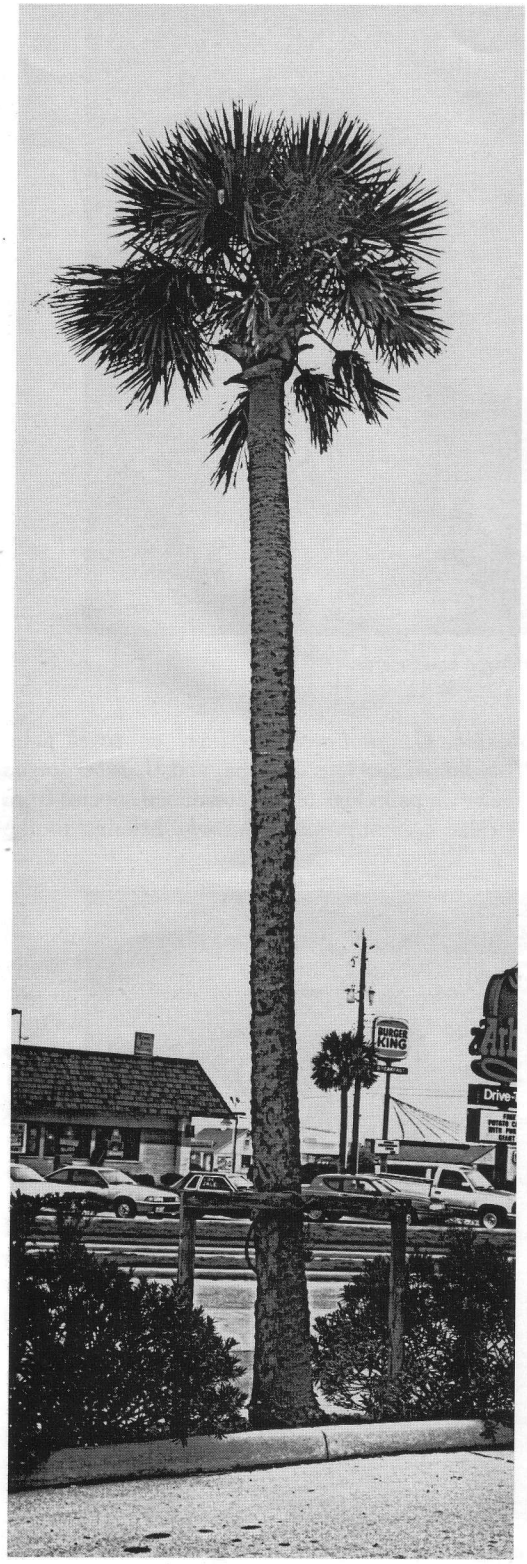
In January 1993 we observed an unusual agaric, *Gymnopilus palmicola*, producing mushrooms (basidiocarps) on the adventitious roots erupting from the lowest portion of the trunk of one of these transplanted palms. Over the last 15 years that we have observed palms on the Upper Texas coast, we have never seen basidiomycetes produce mushrooms on the trunks of any palms. The palm literature (e.g., Carpenter and Elmer 1978) on fungal-palm associations mainly concerns disease-causing species and does not list *Gymnopilus* species associated with palms. The mycological literature (e.g., Hesler 1969) lists *Gymnopilus* spp. associated only with dead palms (palm logs).

A description of this fungus, *Gymnopilus palmicola*, collected from a *Sabal palmetto* in Galveston, Texas on January 5, 1993 and December 3, 1993 is given below.

Gymnopilus palmicola Murrill, Mycologia 5: 23 1913. Figs. 1–4.

The basidiocarps are in clustered groups, emerging from the adventitious roots (roots that arise secondarily above the soil line from the palm trunk or stem, see Figs. 1,2). The mushroom cap or pileus 25–55 (–70) mm, campanulate (bell-shaped) to becoming expanded convex, disc obtuse or sunken, margin upturned or straight, sometimes looks like striate, bright-yellow to orange-yellowish sometimes saffron colored or darker with age, flesh of the mushroom leathery, zoned scaly or flocculose (wooly or fluffy); disc with spiny appendages especially when young, scales rust-brown, sometimes with olive green hue (probably due to superficial occurrence of algae or other fungi, e.g., *Alternaria* sp., trapped by the scales) (Figs. 3,4a), and has an unpleasant odor. Gills or lamellae of mushroom are sinuate, crowded, saffron-yellow becoming darker rusty-yellow with age, and turn magenta in 5% KOH. Stipe 10–35 (–55) × 5–8 (–12) mm, excentric, rarely central, tapering towards the base, yellowish with saffron hue, leaving apical ring zone, persistant, (similar to *Cortinarius armillatus* (Fr.) Fr.), cortina-like (curtain-like) fibrils present at stipe apex (or top of stalk) especially when young. Spore print is rust brown.

The fungus' reproductive spores or basidio-



spores are (7.2–) 7.8–11 (–11.7) × 4.5–6.5 (–7.2) μm, ellipsoid, honey-yellow to brown in 3% KOH, thick-walled, punctate-warted (Fig. 4b). Basidia, the cells on the gills producing basidiospores are 4-spored, 20–27 × 5–7 μm (Fig. 4c). Cheilocystidia short clavate to capitate or narrowly lageniform (flask-shaped), 20–60 × 6–10 μm, hyaline, thin to moderately thick-walled (Fig. 4d); pleurocystidia more cylindric-clavate to capitate, similar to cheilocystidia, but thick-walled, honey-yellowish or darker in alkali. Pileipellis is composed of interwoven hyphae or chains of fungal cells (Fig. 4e); end cells squamulose (covered with small scales), cystidioid 4.5–8.1 (–11) μm in width, often in chains, darker yellowish, most of them highly incrusted with spiral thickenings. Stipitipellis of thick-walled parallel hyphae (2.7–8.1 μm width); oleiferous (oily in appearance) hyphae present in pileus trauma are thick-walled, dark chrome yellowish septate and less than 5 μm in width. Clamp connections present.

Material studied: the mushrooms emerging from adventitious roots above the soil level of *Sabal palmetto* in clustered group. Galveston, Texas 1–5 January 1993 and 3 December 1993. Specimens collected January 1993 are deposited at Department of Biology, Virginia Tech, Blacksburg, Virginia and those collected December 1993 are deposited as BPI No. 802362, Systematic Botany and Mycology Laboratory, ARS, USDA, Beltsville, MD 20705.

The collection agrees macroscopically and microscopically with the description of *Gymnopilus palmicola* given by Hesler (1969, p. 26), although the magenta coloration of the gill in KOH differs from the pallid color reported by Hesler who also failed to include pleocystidia. This is the first report of *G. palmicola* from Texas (see Metzler and Metzler, 1992) and the unusual occurrence of this fungus suggests it was introduced with the palm from Florida. The habitat is unusual as *Gymnopilus* spp. are known only to attack palm logs not living palm trees; however this mushroom may be growing on the damaged and possibly decomposing roots of this living palm. Hesler (1969) reported six wood rotting (lignicolous) *Gymnopilus* spp. growing on dead palms out of the 73 species of *Gymnopilus* he recognized: *G. aerolatus* Murr. on palm logs of undetermined

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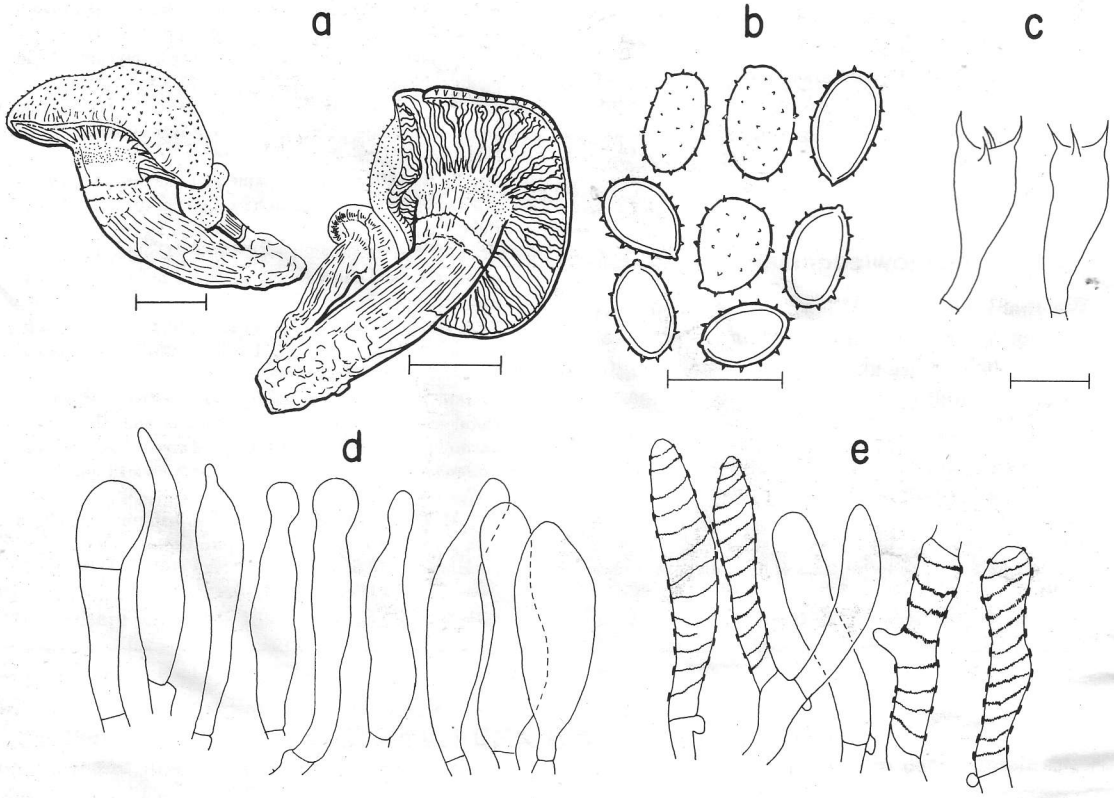
1. This *Sabal palmetto* has basidiocarps at base.

2. Base of palm trunk with aged basidiocarps.

species in Cuba, *G. chrysotrichoides* Murr. on coconut logs in Cuba, *G. earlei* Murr. on coconut logs in Jamaica, *G. palmicola* on palm logs of undetermined species from Cuba, Florida, and Mexico, *G. pholiotoides* Murr. on royal palm (*Roystonea* sp.) logs in Cuba, and *G. subtropicus* Hesler on palm logs of undetermined species from Florida. *Gymnopilus palmicola* belongs to the

3. Basidiocarps removed from palm to reveal gills.



4. a. Habit. Scales 1 cm. b. Basidiospores. Scale 10 μm c. Basidia. d. Cheilocystidia and pleurocystidia. e. Pileipellis with spiral thickenings. 10 μm scale at right applies to Figures 4c–e.

Section Annulati of the genus and three of the above fungi that grow on palm logs belong to this section (*G. chrysotrichoides*, *G. pholiotoides*, and *G. palmicola*); the other three species belong to the Section Gymnopilus. The basidiospore size of *G. chrysotrichoides* is in the range of our specimens; *G. aureolatus* and *G. subtropicus* have smaller basidiospores and the basidiospores of *G. earlei* and *G. pholiotoides* are narrower.

Palms are known to have fungi penetrate and live symbiotically in their root cells (endomycorrhizal). The fungi in the palm root cells form vesicles on a branched tree-like series of cells [vesicular-arbuscular (VA) mycorrhiza]. The first report of palm mycorrhiza was that of the VA mycorrhiza of *Cocos nucifera* and the oil palm, *Elaeis guineensis* by Rayner (1939). Barry, Jr. (1962) encountering seedling mortality of tropical palms strongly suspected that absence of mycorrhizal fungi was the cause of seedling mortality. Nadarajah (1980) found what he believed to be the mycorrhizal fungus *Glomus* sp. in the root cortex but not the vascular system of *E. guineensis*. de Awis and Abeynayake (1980) found endomycorrhiza in *Caryota urens* but not *Areca catechu*. In spite of the limited reports of palms with mycorrhiza and other non-pathogenic fungi these associations may be more frequent than previously thought and strongly support Barry, Jr's hypothesis that tropical palms may have need of mycorrhizal associations for survival.

The *Gymnopilus-Sabal* association appears to be parasitic or decomposer in nature (and lignicolous) rather than benign or symbiotic (mycorrhizal) as the lignicolous habit is common in the genus (and there are no prior reports of this fungal genus being mycorrhizal) and no other reports exist of fungi of this genus growing on living palms. We suggest that microbial flora along with *Gymnopilus* is associated with the decomposition of the palm root cell walls thus producing a suitable substrate among the adventitious roots for this basidiomycete (the mushroom forming fungi) to form mushrooms. No apparent damage to the

palm tree by the agaric (a group of basidiomycetes) has been noted which also suggests that this fungus is a decomposer living on damaged roots rather than a parasite. It is very possible that the palm trunk was damaged and this provided a substrate for a fungus which rots wood. No adjacent *Sabal* palms had these mushrooms.

Acknowledgments

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CHAPTER NEWS AND EVENTS

Southern California News

The Southern California Chapter of the International Palm Society met in Ventura on March 18, 1995. The event featured three speakers. Don Tollefson spoke on his experiences during the IPS Post-Biennial Tour in Venezuela, run by Lost World Adventures and the IPS; Don Hodel provided an update on the *Chamaedorea* genus since publication of his book on *Chamaedorea* palms; and, Ralph Velez gave a presentation on the reverse osmosis process he uses to water his palm garden. Following the lectures, members and guests toured the Palm Garden at Ventura College.

The next meeting of the Southern California Chapter is scheduled for May 20 in Malibu, California, at the home of member Dave Anawalt. For information on subsequent 1995 meetings of the California Chapter, please contact any of the officers listed in your roster.

Lynette Wood has taken over from Bo-goran Lundkvist as Editor of the Palm Journal of the Southern California Chapter. We wish Lynnette the best in this new assignment.

As mentioned in the January issue of *Principes*, subscription rates have increased for The Palm Journal of the Southern California Chapter, IPS. The rate for six issues per year for active IPS members is now as follows: US$20 chapter dues for U.S. residents, US$27 per year for residents of Mexico or Canada, and US$30 for overseas subscribers, plus US$10 additional for optional airmail delivery. Send checks in US funds payable to the Southern California Chapter and mail to IPS, So. Cal. Chapter, 1601 Via Sage, San Clemente, CA 92673.