

A New Species of *Lycopodium* from the Peruvian Andes

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At the beginning of my study of Lycopodiaceae from the South American Andes, a specimen was found which could not be referred to any of the taxa already known in the group. The description of this new species, with additional information on its internal morphology, distribution, and affinities, is given in this paper.

Lycopodium papillatum Rolleri, sp. nov.

Figs. 1-17.

Planta terrestris vel saxicola, ca. 40 cm alta, in dimidio inferiori sterilis, superne fertilis. Caulis digitatus candelabriformis 3-4-dichotomus ca. 2-3 mm crassus erectus flexibilis saepe rubescens papillosus. Folia fertilia et sterilia isomorpha, sed fertilibus minoribus, numerosa inflexa haud adpressa non imbricata (caulibus et sporangiis parum visibilibus) in verticillis 5-foliatis disposita, ovali-deltaidea symmetrica 10.5-11 mm longa crassa, basi expansa subcuculliformia, apice acuta inflexa, papillosa, papillis numerosis conicis, supra tantum marginalibus, infra totam laminam tegentibus. Sporophylla cum area circulari papillosa basali juxta sporangium. Sporangia reniformia conspicua axillaria. Sporae tetraedro-globosae, (77)84(87) μm diametro, parte distali foveolata, parte proximali laevi.

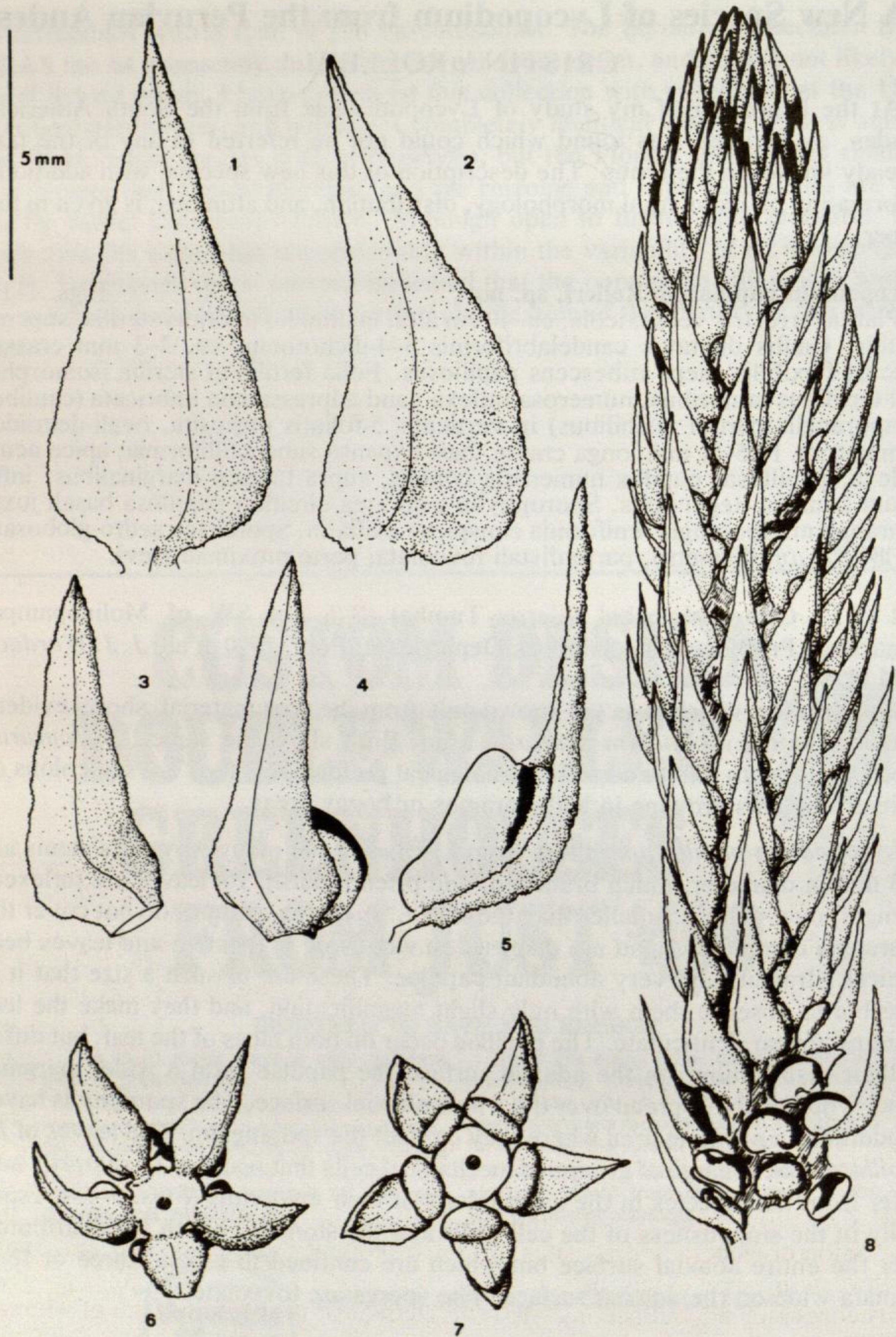
TYPE: Cerro Malcabal (Cerro Tumbe), 3-6 km SW of Molinopampa, Amazonas Province, Chachapoyas Department, Peru, 2900 m alt, *J. J. Wurdack* 1456 (US).

This species, which is as yet known only from the type material, shows evident affinities with *Lycopodium saururus* Lam. Both show the same "*L. saururus* type"¹ of growth habit and similar ecological preferences; they are saxicolous or terrestrial plants growing in high paramos or boggy areas.

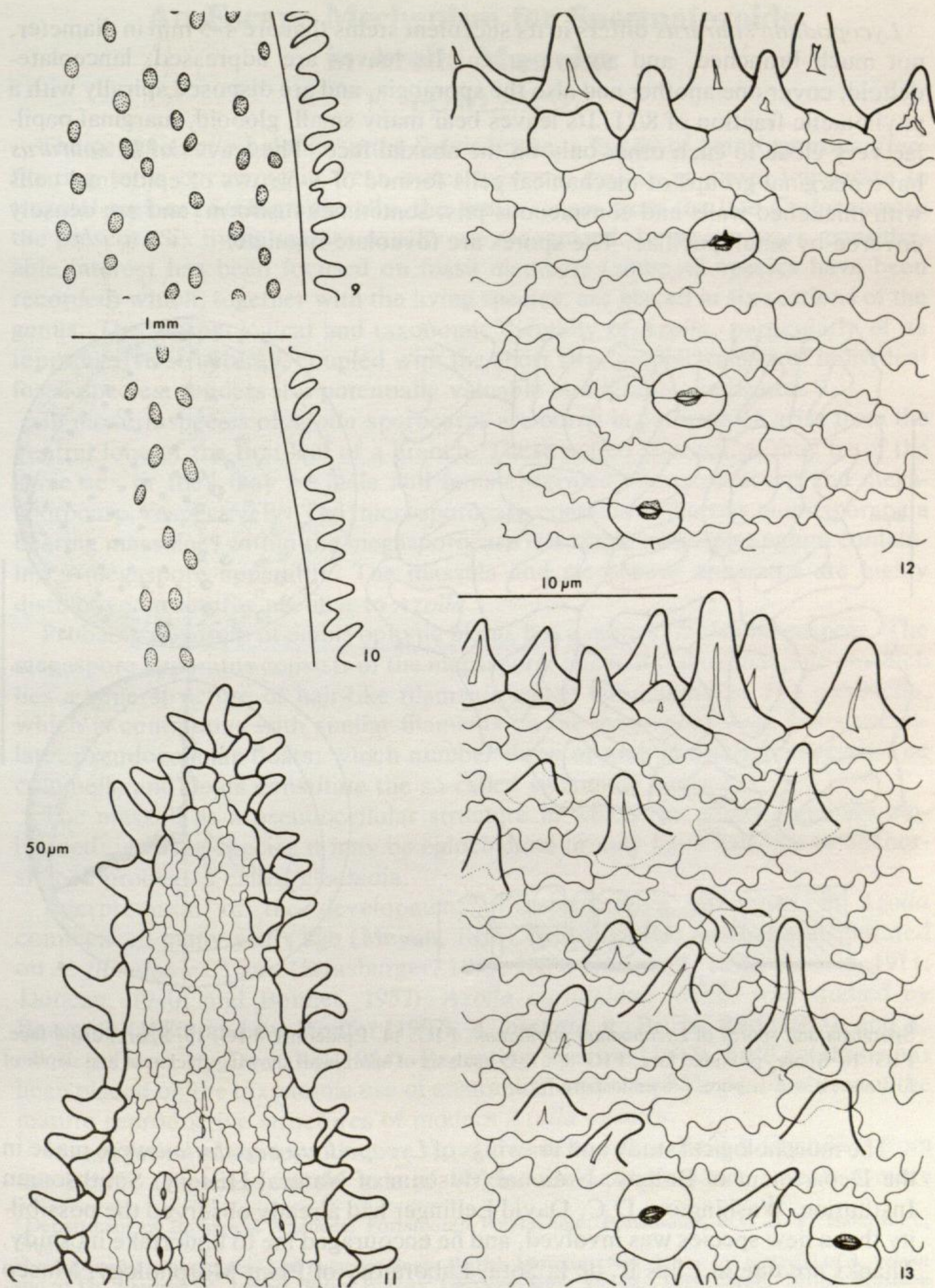
Lycopodium papillatum differs from *L. saururus* in many ways. Its stems are 2-3 mm in diameter, much branched, and often reddish. Its leaves are inflexed, straight, oval-deltoid, smaller than those of *L. saururus*, distant, do not cover the sporangia completely, and are disposed in whorls of 5. Its stem and leaves bear conical, straight, and very abundant papillae. These are of such a size that it is possible to observe them with only slight magnification, and they make the leaf margins appear denticulate. The papillae occur on both faces of the leaf, but differ in their distribution: on the adaxial surface the papillae form a wide, marginal band, whereas they spread over the whole abaxial surface. The sporophylls have, in addition, a papillate area where they contact the sporangium. The leaves of *L. papillatum* lack marginal groups of mechanical cells that occur in *L. saururus* and differ from that species in the morphology of their epidermis (Figs. 9-13), especially in the sinuousness of the cell walls and the stomata, which are distributed over the entire abaxial surface but which are confined to a band three or four stomata wide on the adaxial surface. The spores are foveolate.

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¹Rolleri, Cristina. 1972. Morfología comparada de las especies de *Lycopodium* (Lycopodiaceae-Pteridophyta) del noroeste argentino. *Rev. Museo La Plata n.s.*, 12: 223-317.

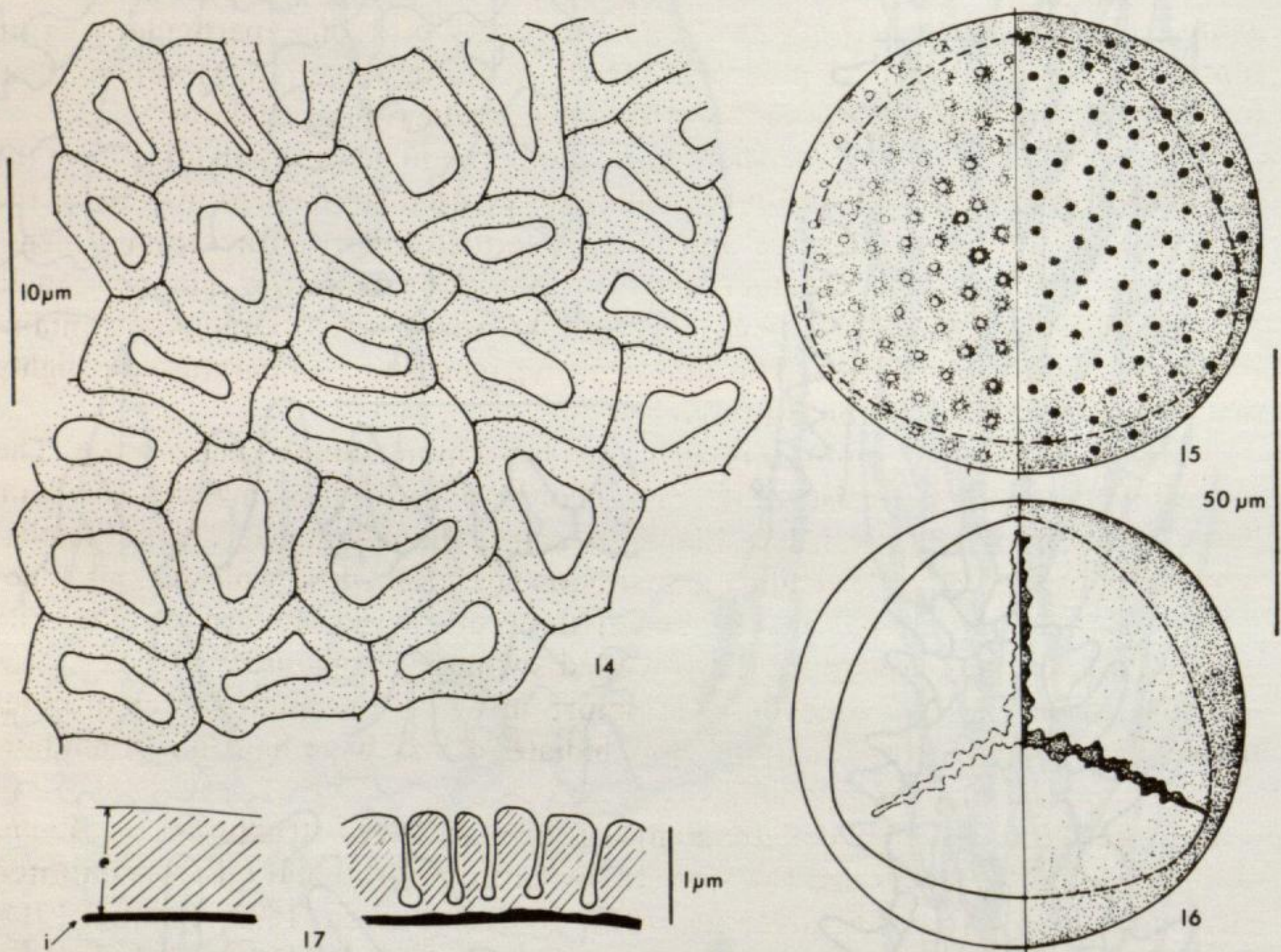


Morphology of *Lycopodium papillatum* leaves. FIGS. 1-2. Sterile leaves. FIGS. 3-5. Fertile leaves. FIGS. 6-7. Verticillate phyllotaxis with five leaves. FIG. 8. Fertile branch tip.



Anatomical details of *Lycopodium papillatum* leaves. FIG. 9. Stomata on abaxial surface. FIG. 10. Stomata in a band on adaxial surface. FIG. 11. Sterile leaf tip. FIG. 12. Epidermis of abaxial surface. FIG. 13. Epidermis of adaxial surface.

Lycopodium saururus differs in its succulent stems that are 4–5 mm in diameter, not much branched, and always green. Its leaves are adpressed, lanceolate-deltoid, cover one another and also the sporangia, and are disposed spirally with a phyllotactic fraction of 8/21. Its leaves bear many small, globoid, marginal papillae very close to each other only on the abaxial face. The leaves of *L. saururus* have marginal groups of mechanical cells formed of 3–5 rows of epidermal cells with thickened walls and conspicuous pits, sometimes fusiform, and are densely covered by small papillae. The spores are foveolate-rugulate.



Sporangia and spores of *Lycopodium papillatum*. FIG. 14. Epidermis. FIG. 15. Spore, distal face. FIG. 16. Spore, proximal face. FIG. 17. L-O analysis of spore wall showing thickness and depth of foveolae; e = exospore, i = endospore.

The morphological study and drawings of *Lycopodium papillatum* were made in the Department of Botany, National Museum of Natural History, Smithsonian Institution, Washington, D.C. David Lellinger had already observed the possibility that a new species was involved, and he encouraged me to undertake its study. Thanks are due to Eñías R. de la Sota, Laboratory of Plant Morphology, Museo de La Plata, for his suggestions on and corrections to the original manuscript, and to Angel L. Cabrera, Vascular Plants Division, Museo de La Plata, for helping me with the Latin description.