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CAPSICUM TOVARII (SOLANACEAE), A NEW SPECIES OF PEPPER FROM PERU

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Eshbaugh, W. Hardy (Department of Botany, Miami University, Oxford, OH 45056), Paul G. Smith (Department of Vegetable Crops, University of California, Davis, CA 95616), and Daniel L. Nickrent (Department of Botany, Miami University, Oxford, OH 45056). *Capsicum tovarii* (Solanaceae), a new species of pepper from Peru. Brittonia 35: 55–60. 1983.—A new species of *Capsicum* (**Capsicum tovarii**), found on the slopes of the Mantaro river basin, Departments Huancavelica and Ayacucho of Peru, is described. Distribution and relationships within the genus are discussed.

During the past 25 years, the field studies and research of the authors and Charles B. Heiser, Jr. have led to the discovery and recognition of several new taxa in the genus *Capsicum* in South America (Heiser & Smith, 1958; Eshbaugh & Smith, 1971). Several years ago the authors were made aware of a pepper species believed to be endemic to the valleys of the Mantaro river basin in the Department of Huancavelica, Peru. Our continuing investigation has convinced us that it is indeed a new species of *Capsicum* which we describe here for the first time.

Capsicum tovarii Eshbaugh, Smith & Nickrent, sp. nov. (Figs. 1–8)

Plantae usque ad 1 m altae, perennes, suffrutescentes. *Caules* diffusi vel scandentes, sympodialiter ramosi. *Folia* decidua, alterna, ovato-lanceolata (juniora trullata), 3.5–8.2 × 1.5–3.8 cm, venatione pinnata (brochidodroma), lamina supra glabra vel sparsim pubescente infra sparsim pubescente etsi villosa in venarum axillis, apice acuminata vel attenuata, margine integra trichomatibus strigillosis uniseriatis instructa, basi attenuata, petiolo parum canaliculato 1–3 cm longo. *Inflorescentia* axillaris e dichasiis compositis constata. *Flores* de facto uni- vel bisexuales, actinomorphi; *calycis tubus* calathiiformis, 1.3–1.9 × 1.8–2.6 mm, membranaceus inter lobis, dentibus 5 variabilibus 0–1.3 mm longis glabris vel puberulis; *corolla* purpurea cremeaque vel cremea, punctis viridibus duo basi cujusque lobi maculata, campanulata, 4.4–8.5 mm lata, lobis cum vel sine unguibus apicalibus, marginibus loborum varie papillatis; *stamina* 5 epipetala, lobis corollae alterna, antherarum sacculis (thecis) parallelis extrorsis dorsifixis; *ovarium* bicarpellatum, 0.9–2.6 × 0.9–1.5 mm; *stylus* apicalis, heteromorphus, 1.5–7.6 mm; *stigma* clavatum bilobum vel quadrilobum; *ovula* 4–8 in quoque ovario, anatropa. *Fructus* bacca gustu pungens rubra globosa 4.4–7.6 × 4.2–7.3 mm, pedicello 1–2 cm longo. *Semina* 3.5–4.5 mm longa, cremea, striata vel reticulata, minute tuberculata, auriformia. ($n = 12$). Florescentiae mense Maio.

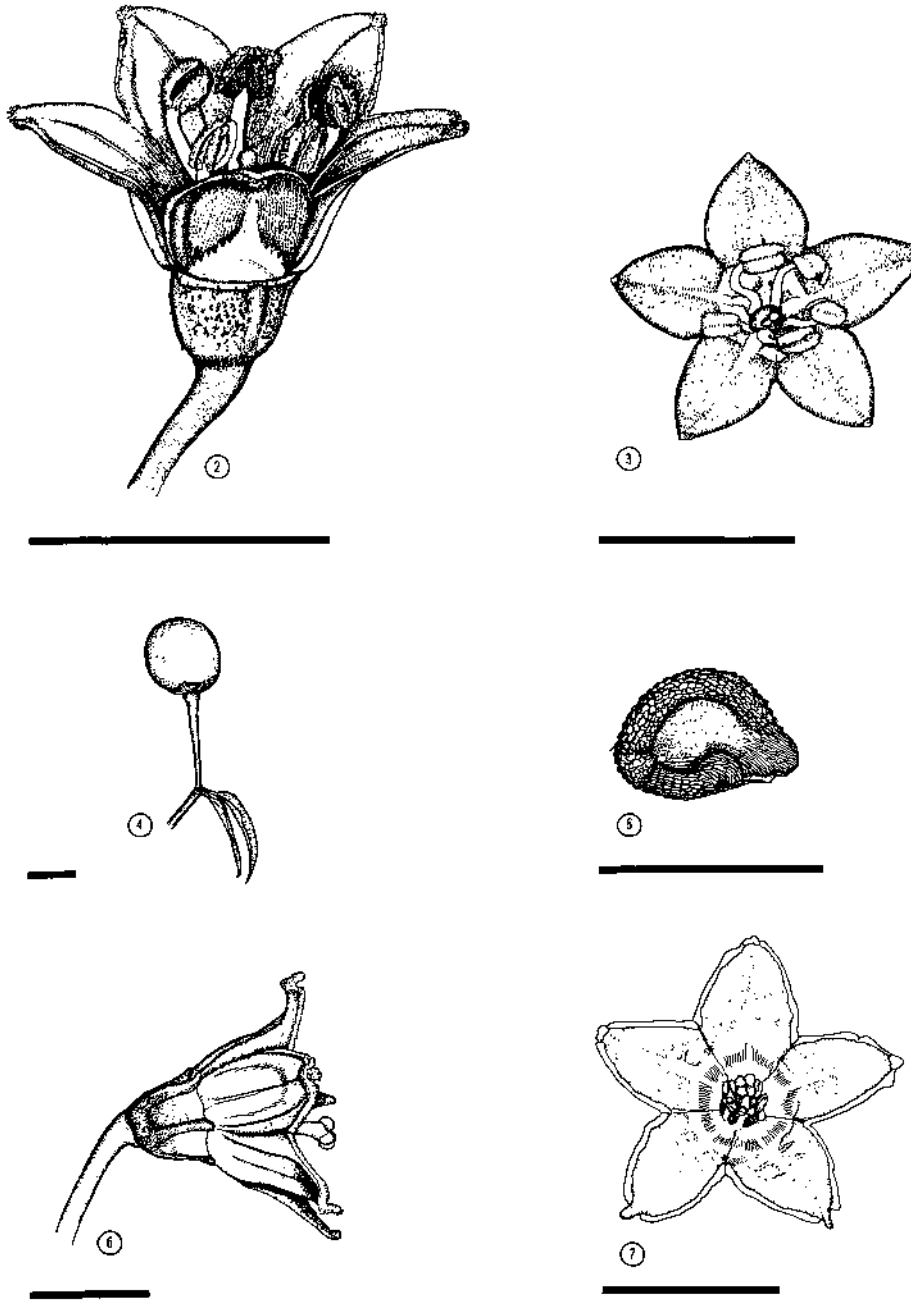
Plants to 1 m tall, perennial. Suffrutescent, stems diffuse or clambering, sympodially branched. Leaves deciduous, alternate, ovate-lanceolate (trullate when young), 3.5–8.2 × 1.5–3.8 cm, venation pinnate (brochidodromous), blade glabrous to sparsely pubescent above, sparsely pubescent below, villous in axils of veins beneath, apex acuminate to attenuate, margins entire, with uniseriate strigillose trichomes, base attenuate; petiole slightly channeled, 1–3 cm long. Inflorescence composed of axillary compound dichasia. Flowers functionally unisexual or bisexual, actinomorphic; calyx tube cup-like, 1.3–1.9 × 1.8–2.6 mm, membranous between lobes, teeth 5, variable, 0–1.3 mm long, glabrous to puberulent; corolla purple and cream or cream, marked with 2 green spots at base of each lobe, campanulate, 4.4–8.5 mm broad, lobes with or without an apical claw, margins of lobes variously papillate. Stamens 5, epipetalous, alternating with the corolla lobes, anther sacs (thecae) parallel, extrorse, dorsifixed; ovary bicarpellate, 0.9–2.6 × 0.9–1.5 mm; style apical, heteromorphic, 1.5–7.6 mm long, stigma clavate or 2–4 lobed; ovules 4–8 per ovary, anatropous. Fruit a pungent red globose berry, 4.4–7.6 × 4.2–7.3 mm, pedicel 1–2 cm long. Seeds 3.5–4.5 mm long, cream colored, striate to reticulate, minutely tuberculate, auriform. ($n = 12$). Flowering in May.

FIG. 1. *Capsicum tovarii*, general habit. Scale = 10 cm. (Drawn from *Eshbaugh* E-1137-1.)

TYPE: PERU. DEPT. HUANCAVELICA: Prov. Tayacaja, Huaya, entre Colcabamba y Surcubamba, valle del Mantaro, flores azul-morado (violaceo), arbusto caducifolio de 0.50–1.0 m alto, alt. 2000–2200 m, 14 Apr 1954, *Oscar Tovar 1867* (HOLOTYPE: USM; ISOTYPES: MU, US).

Other specimens examined: PERU. DEPT. HUANCAVELICA: Prov. Tayacaja, Quintabamba, distrito Huachocolpa, valle del Mantaro, alt. 850 m, 21 Apr 1963, *O. Tovar 4114* (USM, MU, US); Mantaro valley between Pampas and Salcabamba, alt. 1800 m, 16 Apr 1962 (collector O. Tovar), *P. G. Smith Ac 2017* (DAV, MU). DEPT. AYACUCHO: Prov. Huanta, in chacra and on scree slopes around Huanchuy, 8 km upstream from bridge where Huanta road crosses the Río Mantaro, 28 Mar 1971, *B. Pickersgill 401* (RNG); on slopes of hills north of Huanta, alt. 2000 m, Apr 1971 (collector H. G. Marshall), *Eshbaugh E 1137* (MU, US).

Pickersgill (pers. comm., 1 Dec 1981) has also indicated that she has seen



FIGS. 2–7. Detailed figures of flower, fruit, and seed characteristics. 2–3. Flowers of *C. tovarii* (E-1137-2). 4. Fruit (E-1137-1). 5. Seed of *C. tovarii* (E-1137). 6–7. Flowers of *C. tovarii* (E-1137-1). Scale = 0.5 cm.

material of this species from the Department of Apurimac, Province Andahuaylas. Collections of some of the above cited specimens also exist at Indiana University but they have not yet been integrated into the permanent collection.

Heiser (1976) first used the name *C. tovari* in his treatment of the cultivated

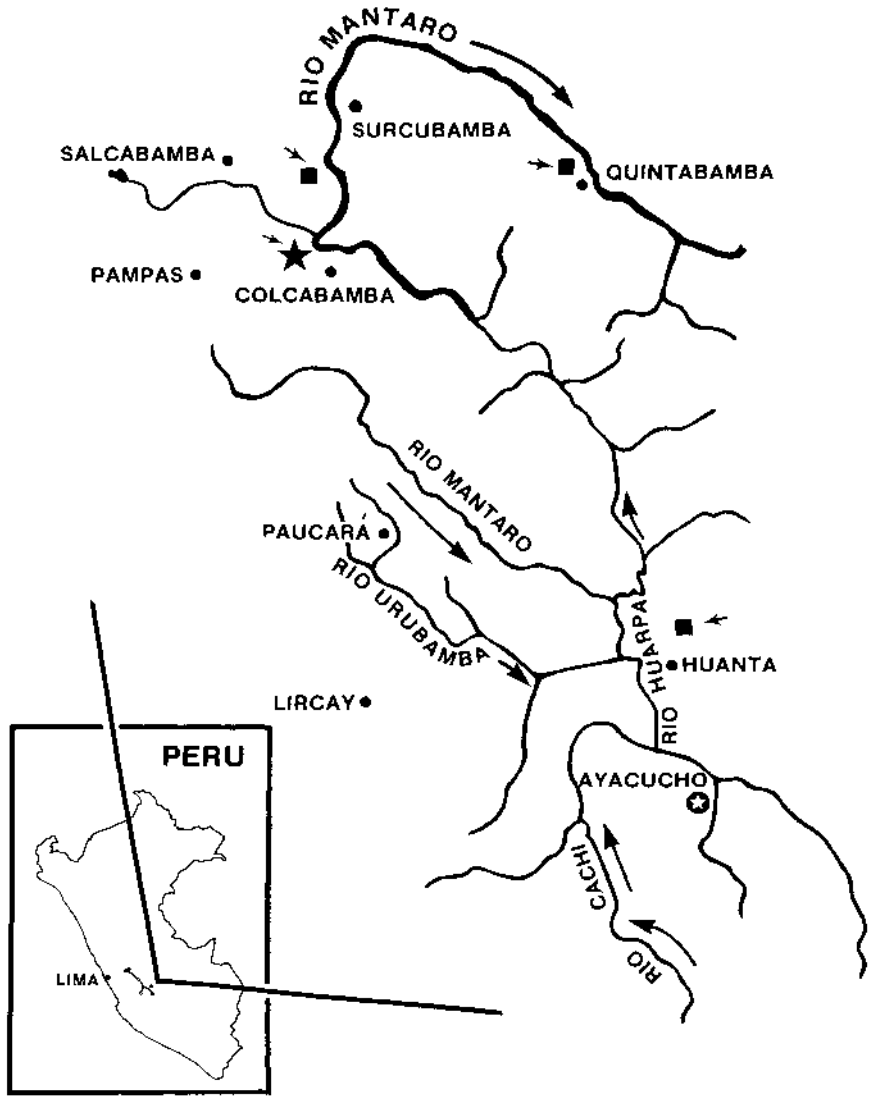


FIG. 8. Collection sites of *Capsicum tovarii* in the Mantaro River basin. Type specimen ★ and other collections ■.

peppers. Because this name was published without a diagnosis or description it should be cited as a *nomen nudum*. Also, according to article 73 C.1 (a) and (b) of the ICBN the correct spelling of the epithet is *tovarii*. Reference to *C. tovarii* has appeared as an unnamed species (McLeod et al., 1979a) and as *C. tovari* (Eshbaugh, 1977, 1980, 1982; McLeod et al., 1979b; Jensen et al., 1979).

Capsicum tovarii is known by the common names Mukúru (Eshbaugh) and Mucuru-uchu (Tovar). It is collected by Indians and used as a spice.

We have only limited ecological data on this species. We know it occurs in several locations throughout the Río Mantaro basin where it is characteristic of the low montane xerophytic zone in association with columnar cactus and *Bombax ruizii* Schumann (Tovar, pers. comm., 17 Mar 1982). The general ecological habitat of *C. tovarii* is reminiscent of that of another restricted endemic, *C.*

cardenasii Heiser & P. Smith of the Department of La Paz, Bolivia (Eshbaugh, 1979).

Studies of breeding behavior which have included this species suggest that it belongs to the so-called purple-flowered species that include *C. pubescens* Ruíz Lopez & Pavon, *C. eximium* Hunz., and *C. cardenasii*). Pickersgill (unpubl.) has successfully crossed *C. tovarii* to *C. eximium* using both species as the male parent and has obtained normally germinating F_1 hybrids. She also has succeeded in obtaining F_1 hybrids from a cross using *C. tovarii* as a male parent to *C. baccatum* L. The significance and true nature of these crosses awaits further analysis and interpretation of the F_1, F_2 and backcross progeny.

We have obtained fruits from crosses of *C. eximium* and *C. baccatum* with *C. tovarii* but we have not yet been successful in getting prolonged seed germination or mature progeny for analysis. The study of the breeding behavior of *C. tovarii* is continuing at MU.

The investigation of isoenzymes (McLeod et al., 1979a, 1979b; Jensen et al., 1979; McLeod et al., in press) among the domesticated peppers and selected wild taxa also suggests that the affinity of *C. tovarii* is closer to the other purple-flowered than to the several white-flowered taxa.

To date one of the most interesting aspects of *C. tovarii* is the peculiar nature of its breeding system, which is under continuing investigation (W.H.E. & D.L.N.). We have noted that certain individuals function only as male or female at a given time while other plants may be functionally bisexual. Furthermore, specific morphological traits may well be associated with sexuality. An interpretation of these observations should prove instructive. Pickersgill (pers. comm., 23 Dec 1982) has noted functional male sterility in *C. baccatum.*

Finally, it should be noted that our limited material of *C. tovarii* is somewhat variable particularly with respect to flower color (violet to cream color) and pubescence (glabrous to weakly pubescent). The range of variation is no greater than that found in several other *Capsicum* species and significantly less than that seen in *C. eximium.* The chromosome count of $n = 12$ agrees with that of Pickersgill (1977) reported for a new species from Peru.

Acknowledgments

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BOOK REVIEW

A Flora of Waterton Lakes National Park. Job Kuijt. 684 pp. 1982. ISBN 0-88864-076-5; paperback, ISBN 0-88864-065-X, hardbound. The University of Alberta Press, 450 Athabasca Hall, Edmonton, Canada T6G 2E8. $15 paperback, $25 hardbound.

The 204 square miles of Waterton Lakes National Park contains 55% of all Albertan species. This is a significant figure when one considers that the park covers only 0.08% of the province.

The hardbound edition is attractive in its binding, paper, and typography. Most of the species are illustrated by line drawings and there are eight nicely reproduced color plates. There is a glossary, a contour map of the park repeated on both inside covers, a bibliography, and a thorough index. Families are in an alphabetical arrangement in one series that includes the ferns, the fern allies, the gymnosperms, and angiospermous monocots and dicots. So many other floras using an alphabetical sequence of families have tediously compromised it with a natural system by segregating these groups. The species are completely keyed, fully described and infraspecific taxa are adequately distinguished. There is mention of species not yet found but expected to be in the park and mention of erroneously published reports, clearing them up.

The keys and descriptions are written in as nontechnical terms as possible to reach the amateur, and Kuijt has skillfully maintained scientific accuracy. Most of the illustrations were drawn by him. They are attractively composed and capture the essence of the species. With economy of line and virtually no enlarged details he still manages to display the important characteristics of the species and the illusion of three-dimension. In groups I am familiar with I can easily distinguish the species by their illustrations.

In the first revision the addition of running heads with family names would be helpful in tracking down the species. Some pages open up with only abbreviations of generic names and you do not know at once where you are in your search.

Job Kuijt seems to be a man of his own mind. The taxonomic decisions seem to be his own, based on his own experience with the flora and the knowledge he has gained from published accounts and personal communications with specialists. For example, he keeps *Gentiana* intact (not following many recent treatments in which *Gentianella* and *Gentianopsis* have been segregated out), but recognizes five species of *Taraxacum*.—NOEL H. HOLMGREN, Editor.