

*Nardus stricta* and *Eleusine multiflora* (Gramineae),  
new to Mesoamerica

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**Resumen:** *Nardus stricta* L. se encuentra en el volcán Turrialba, Costa Rica, acompañado por varias especies de gramíneas europeas. *Eleusine multiflora* Hochst ex A. Rich., una especie africana, fue colectada en Jalisco y Chiapas, México.

*Nardus stricta* L. is a common grass of boreal Eurasia and Greenland, occurring also as a casual introduction in the northern United States and Canada. It has not previously been found in Central America. The collection listed below represents its first known occurrence in Costa Rica. A number of alpine grasses from Europe occur in similar habitats on the volcanoes of the Cordillera Central. Probably they represent survivals from early introductions of mixtures of European pasture grasses which were imported to provide forage for dairy cattle. Among this group of waifs are such species as *Agrostis gigantea* Roth, *A. stolonifera* L., var. *palustris* (Huds.) Farwell, *A. tenuis* Sibth., *Aira caryophylla* L., *Anthoxanthum odoratum* L., *Cynosurus cristatus* L., *Briza minor* L., *Danthonia decumbens* (L.) Lam. & DC., *Festuca arundinacea* Schreb., *F. ovina* L., *F. rubra* L., *F. tenuifolia* Sibth., *Glyceria plicata* (Fries) Fries, *Holcus lanatus* L., *Poa annua* L., *P. pratensis* L., *P. trivialis* L., *Vulpia bromoides* (L.) S.R. Gray, *V. myuros* (L.) K. Gmel., var. *harsuta* Hack.

*Nardus stricta* forms dense tufts, arising from a very short rhizome. The foliage is mostly basal, and the blades are very narrow, wiry, and folded. The inflorescence is very slender and spikeate, with two rows of erect spikelets borne on two sides of the triquetrous rachis, usually appressed to the shallow cavities of the rachis. The glumes are reduced to a minute rigid cupule, from which the single awned floret disarticulates (Fig. 1). Because of the pe-

culiar inflorescence and spikelets and the anomalous leaf anatomy, the systematic position of *Nardus* has been interpreted variously. The genus has been assigned to the Pooideae (= Festucoideae) by Pilger (1954) and by Stebbins and Crampton (1961). Tateoka (1957) placed it in the Arundinoideae. While various chromosome numbers have been reported for *Nardus*, the usual count is  $2n=26$ , with other numbers up to  $2n=30$  also having been reported. Any of these numbers would be highly anomalous in the Pooideae.

Leaf blade cross-sectional anatomy is highly xeromorphic. The densely packed mesophyll and the evidence of an outer bundle sheath with empty cells suggests that *Nardus* belongs to the Arundinoideae. Both leaf epidermes show bicellular microhairs with equal cells, the terminal one being pointed, a feature which would also exclude *Nardus* from the Pooideae. Stomata are present only on the adaxial surface of the blade and are broadly oval in contrast to the oblong stomatal complexes of the Pooideae. The lower surface shows silico-suberized couples, which is normally a pooid feature, and highly lignified single-celled macrohairs. On the basis of available morphological and cutological evidence, *Nardus* appears to be a very isolated genus, but best assigned to the Subfamily Arundinoideae. The only known Central American collection is the following:

**Costa Rica:** Prov. Cartago: In upper pastures. Volcán Turrialba, alt. 3000-3300 m. *Wes-*

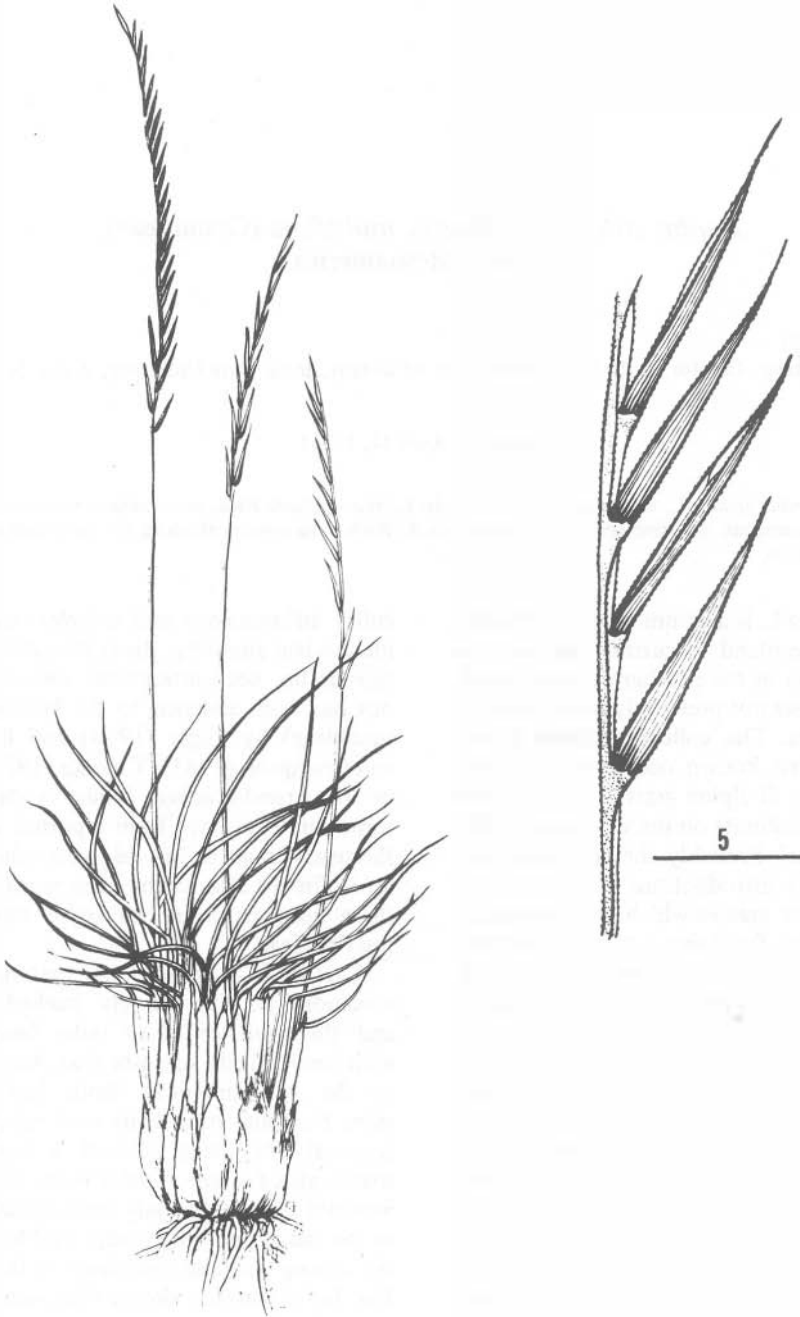


Fig. 1. *Nardus stricta*. A habit, B. portion of spike, dorsal view, showing winged, dentate rachis, C. spikelet. Scale line for spikelet = 1 mm. Scale line for spike = 5 mm.

ton & Kincaid 4950, 5 June 1967 (ISC). *Eleusine multiflora* Hochst. ex A. Rich., an African member of the Subfamily Chloridoideae, has only recently been found in the western hemisphere. It has been reported from Mexico by McVaugh (1983). This species is si-

milar to the pantropical *Eleusine indica* (L.) Gaertn., differing in the short, thick spikes, less than 2 cm long, and in the flattened, winged rachis which is marginally dentate (Fig. 2). Two recent collections from México, cited below, suggest that it is becoming more common and

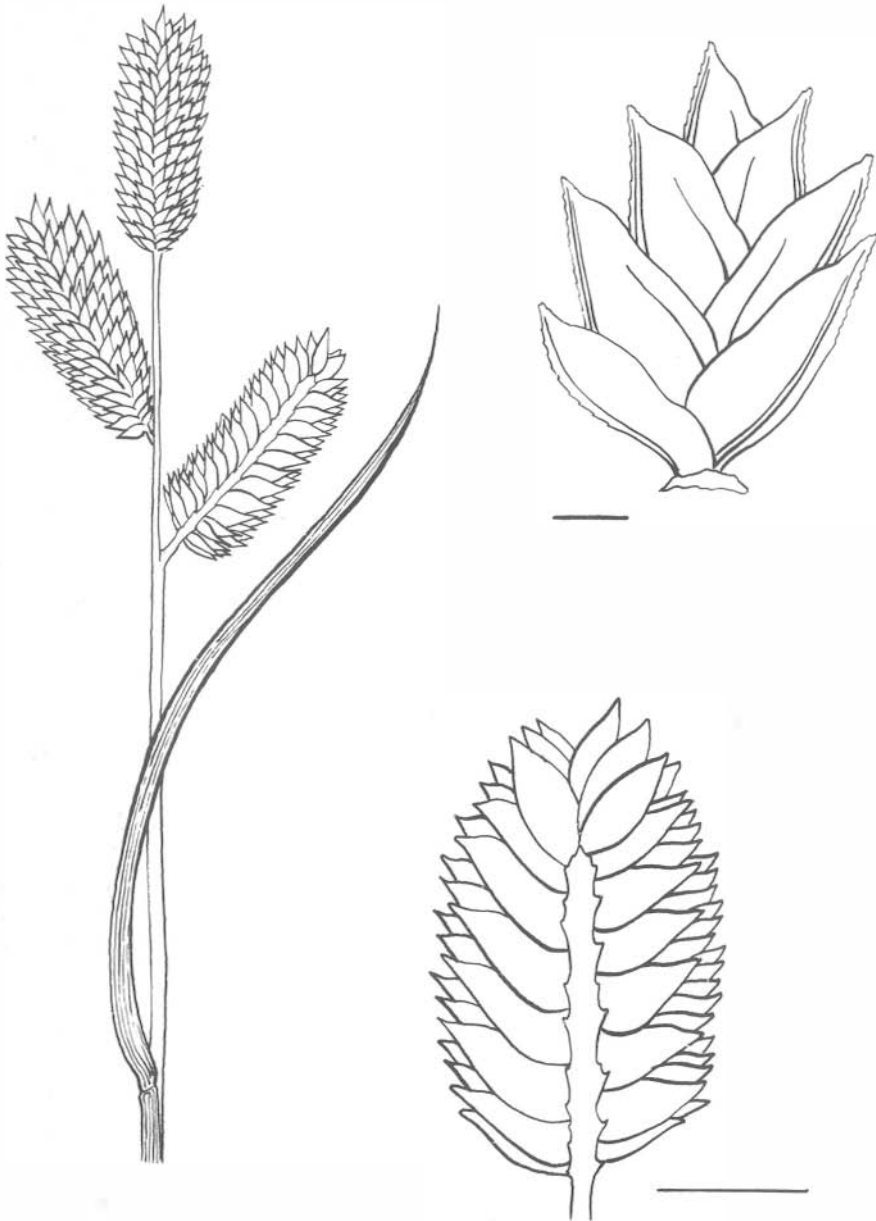


Fig. 2. *Eleusine multiflora*. A. habit. B. single spike, dorsal view, showing winged, dentate rachis, C. spikelet. Scale line for spikelet = 1 mm. Scale line for spike = 5 mm.

may eventually be found in Central America.

**México:** Chiapas: San Cristobal las Casas, elev. 7100 ft. **Breedlove & Raven 8266, (US);** Jalisco: 15 km s.w. of Matanzas, 2100 m, **Luna 4455 (ISG).**

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