

THE GENUS LAMARCKIA MOENCH (POACEAE) IN BRAZIL: A QUESTION

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ABSTRACT - (The genus *Lamarckia* Moench (Poaceae) in Brazil: a question). Doubts as to whether *Lamarckia aurea* (L.) Moench may be legitimately regarded as a constituent of the Brazilian grass flora are investigated. In view of the conclusion that existing records for the species in Brazil may be of dubious accuracy, a history of the genus, a brief taxonomic treatment, and a discussion of distribution are included, with the intention of eliciting possible further records.

RESUMO - (O gênero *Lamarckia* Moench (Poaceae) no Brasil: uma pergunta). Investiga-se as dúvidas quanto ao fato de *Lamarckia aurea* (L.) Moench pertencer ou não à flora de gramíneas brasileiras. Em vista de se concluir que os registros dessa espécie sejam de natureza duvidosa, incluem-se neste trabalho o histórico do gênero, breve tratamento taxonômico, e uma discussão da sua distribuição, com a intenção de se encorajar possíveis futuros registros de sua ocorrência no território brasileiro.

Key words: Brazil, Gramineae, *Lamarckia*, Poaceae

INTRODUCTION

Lamarckia Moench is a genus of one species only, *Lamarckia aurea* (L.) Moench, described within that genus in 1794 and based on *Cynosurus aureus* L. (1753). It is a native of the Mediterranean region, but has come to be recognized as a well-known 'traveller', and is known as an ornamental, or as an alien, from a variety of environments on several continents.

The relevance of *Lamarckia aurea* to Brazil lies in a single fact. Four collections of the species have *nominally* been made in Brazil. The origin of each of these collections is, for one reason or another, open to doubt. Widespread investigation of herbaria and questioning of colleagues have produced no recent record for the species. In view of current efforts to assess the dimension and composition of the grass flora of Brazil, it becomes of interest to know whether *L. aurea* is to be considered as a naturalized alien, as being an occasional adventive, as being a past ephemeral now unknown in the country, or as having been recorded in consequence of a number of misunderstandings.

MATERIAL AND METHODS

Material of *Lamarckia aurea* (L.) Moench purporting to have been collected in Brazil was sought in those herbaria most likely to hold older collections, namely K, R, RB, SP, US. Particular

attention was paid to interpretation of the information content of the specimen labels. For taxonomic purposes, material from other countries in Central and South America was consulted at US. Thanks are due to the curators and staff of the herbaria concerned. For establishment of distribution patterns, references were drawn from regional floras, and, wherever possible, particularly from grass floras.

HISTORY OF THE GENUS

- Linnaeus (Sp. Pl. 73. 1753) described, under the name of *Cynosurus aureus* L., the single taxon now known as *Lamarckia aurea* (L.) Moench.
- Boehmer (in Ludwig, Def. Gen. Pl. 420. 1760) described the genus *Achyrodes*, but with no species described in the genus.
- Moench (Meth. Pl. 201. 1794) described the genus *Lamarckia*, transferring to it the single species *Lamarckia aurea* (L.) Moench, based on *Cynosurus aureus* L.
- Persoon (Syn. Pl. 1: 180. 1805) described the genus *Chrysurus* with one species, *C. cynosuroides* (L.) Pers., also based on *Cynosurus aureus* L.
- Desvaux (Journ. Bot. 1: 75. 1813) described the genus *Pterium* with one species, *P. elegans* Desv. (= *Lamarckia aurea*).
- De Candolle (Cat. Hort. Monsp. 120. 1813) added the species *Lamarckia tenella* DC., thus lending weight to Moench's genus. This is *Aegopogon tenellus* (DC.) Trin., a New World species which probably arrived in Montpellier via the wool-washing plants at Port Juvenal.
- Sprengel (Syst. Veg. 1: 296. 1825) made the combination *Chrysurus aureus* (L.) Beauv. ex Spreng. from "*Cynosurus aureus* L. *Lamarckia* Moench" (sic).
- Garzia (Rel. Accad. Zel. Sci. Real., Ann. 3-4. 24. 1838) described, without species, the genus *Tinaea*.
- Parlatore (Fl. Palerm. 1: 139. 1845), following Garzia, described *Tinaea elegans* Garzia ex Parl. (= *Lamarckia aurea*).
- Griffiths (Itin. Not. 349: Notul. III.94.1851) described *Lamarckia hookeriana* Griff. (= *L. aurea* (L.) Moench), collected in Afghanistan.
- Kuntze (Rev. Gen. Pl. 2: 758. 1891) made the combination *Achyrodes aureum* (L.) Kuntze, based on *Cynosurus aureus* L., and described a variety, var. *variegatum* Kuntze, from the Cape Verde Islands.

SYSTEMATIC TREATMENT

Lamarckia aurea (L.) Moench, Meth. Pl. 201. 1794.

Small, low-growing annual; culms weak, erect or decumbent; leaf-sheaths mostly overlapping, thin with membranaceous margins, glabrous; ligule membranaceous, narrowly, deltoid, 3.0-10.0 mm long; leaf-blades soft, flat, glabrous, rather light green, 3.0-10.0 cm long, 3.0-7.0 mm broad; inflorescence a contracted panicle of spikelets in fascicles, these falling entire, the terminal spikelet in each fascicle fertile, the others sterile, silvery-green when young, tawny to

purple at maturity; terminal spikelet with one perfect floret, ca. 2.5 mm long (excluding awn), on an extended rhachilla, and one rudimentary floret, ca. 0.6 mm long, on a long thin stipe, glumes sub-equal, thin, narrow, acuminate or short-awned, lemmas of both florets long-awned; lower sterile spikelets 1-2, occasionally 3, 7.0-9.0 mm long, glumes as those of fertile spikelet, florets up to 12 in number, rarely more, reduced to lemmas only, these imbricate, broad, truncate, awnless, scarious above, erose at upper margin.

Morphology and affinities

Lamarckia aurea (L.) Moench, the only species in the genus, is a small annual with a short life, but with an apparent capacity for seeding where it establishes itself. The genus is properly placed in the tribe Poeae, where it has close affinities with *Cynosurus* L.

The inflorescence is, however, quite distinctive, and of some interest. The spikelets are gathered into fascicles; each fascicle contains:

1. a terminal fertile spikelet; the two rather long glumes hold a single perfect floret, and a single rudimentary floret on a long thin stipe (figs. b, c). In *Cynosurus*, the fertile spikelet contains from 1 to 6 (generally 2 - 3) perfect florets, while the rudimentary floret is absent.
2. 1-3 sterile spikelets, below the fertile spikelet and often at least partly concealing it; the glumes are similar to those of the fertile spikelet and hold up to 12 (occasionally more) empty florets, each consisting solely of a broad truncate lemma with an erose upper margin (figs. b, d). In *Cynosurus*, the two narrow glumes hold up to 18 empty florets, each consisting of a distinctively narrow, acuminate, 1-nerved lemma.

Arber (1934) observed that the glumes of the fertile spikelet are often empty or the perfect is also rudimentary, and thus argued in favor of 3 types of spikelet: sterile, fertile, and "spikelets belonging to the fertile type, but reduced to glumes only". Whether this really is a "tendency to reduced fertility", or simply a question of growth, is not clear. The inflorescence at maturity is golden or purplish; thus the name "golden-top", and the popularity of the plant as an ornamental in some parts of the world.

Selected material examined

As the present paper does not constitute a taxonomic revision, the citation of the large amount of material examined which does not bear directly on occurrence of the species in Brazil has been regarded as unnecessary.

SPAIN: Barcelona, Laderas del Tibidabo, 24.IV.1954, Capell s.n. (RB 102213).

MEXICO: Baja California, Ensenada, 1886, Orcutt 1428 (US); Baja California, near Ensenada, 3.V.1923, McKeever 36 (US); Baja California, Rancho Cuevas, 2.IV.1931, Wiggins 5106 (US); Coronado Islands, North Island, 20.III.1958, Moran

- 6545 (US); Baja California, 10 miles S. of La Misión, 28.VI.1962, *Wiggins & Thomas* 386 (US); Baja California, 23 miles S. of Tecate, 23.III.1974, *J. & C. Taylor* 15617 (US); Baja California Norte, 1 mile N. of Camalú, 26.III.1979, *J. & C. Reeder* 7113 (US).
- GUATEMALA: s/loc, 19.V.1896, *C. & E. Seler* 2539 (US).
- COLOMBIA: Around Cali, western side of Cauca Valley, XII.1905, *Pittier* 674 (US).
- BRAZIL: "Rio", s.d., *Sellow* s.n. (RB, SP, US); Environs de Rio de Janeiro, s.d., *Glaziou* 12278 (K); "St. Paul", s.d., *Glaziou* 20120 (K,US); Estado do Rio, Nova Friburgo, IV.1950, *Capell* s.n. (RB 138377).
- PERU: Depto. Lima, Atocongo - La Tablada, 9.XI.1949, *Soukup* 3933 (US).
- CHILE: Valparaiso, 1926, *Gunter* 51 (US).

Distribution

A brief look at the worldwide distribution of *Lamarckia aurea* suggests no very obvious reason why the species should not have established itself in Brazil if, as the records suggest, it has at various times appeared there. It is normally regarded as being originally native to the Mediterranean. Polunin (1969) cites it for Spain, Portugal, France, Italy, Yugoslavia, and Greece - though rather curiously it is not mentioned in Polunin & Smythies (1973) in their relatively more detailed treatment of the flora of south-west Europe. *L. aurea* is not known from northern Europe except as an ephemeral alien, though Clement (1981) notes that "It has repeatedly (but rarely) come into Britain with wool-shoddy". A recent collection has been made (Clement l.c.) as far north as the south of Scotland, labelled "River shingle, Galashiels, (Roxburghs.) June 1979"; it is of some interest that as early as 1907 the occurrence of adventives deriving from wool-refuse thrown into the rivers by the mills at Galashiels was already under observation (Hayward & Druce 1919). The species is not recorded for Albania and Turkey, but was described from Afghanistan under the name of *L. hookeriana* Griff. It is known from the Punjab region of India (Bor 1960), but Gilliland et al. (1971) do not record it for Malaysia. Burbidge (1970) states that "It is to be found in all the southern and eastern states of Australia, but is rarely abundant". It has apparently been known from the Cape Province of South Africa for 80 years or so, but has not spread elsewhere in the Union (Clement 1981).

Rotar (1968) records *Lamarckia aurea* for Hawaii; in the U.S.A. it is cited by numerous for Texas, Arizona, New Mexico, and California - in this last State at least as early as 1882, as an introduction (Beal 1896). Hitchcock (1930) registers the species for parts of Mexico and Guatemala; occurrence in Mexico finds confirmation in Swallen and Hernandez (1961), while there are limited collections from both countries in US.

DISCUSSION

Two facts may be noted with regard to large-scale distribution patterns: *Lamarckia aurea* has substantial tolerance for hot but reasonably dry climates, and is disseminated through

conscious or unconscious human activity. South African material may perhaps have been taken there (Clement 1981) by British sailors from the naval dockyards in Malta; the species is highly decorative - as the vernacular name "golden-top" suggests, and is commonly planted as an ornamental. Appearance of the species in South America in general - and Brazil in particular - would probably be associated with areas of human influence, on the one hand, and fairly hot temperate climate on the other. Roshevits (1980) remarks on its being "naturalized" in Peru - though, apart from one collection in US, it seems to have been overlooked by collectors if this is indeed the case. The species is not mentioned by Hitchcock (1927); Soukup 3933 (US!) was collected in the Lima region in 1949. The only collection seen from Chile is Gunther 51 - a small but characteristic plant collected near Valparaiso in 1926 (US!). Colombian specimens (Pittier 674 (US!)), all before 1905, from near Cali are unusual in their origin, 1000-1200 m above sea level - a fact perhaps reflected in an anonymous annotation "Isn't this a new species of *Lamarckia*?".

Four Brazilian collections have so far come to light, yet each must in certain ways be considered as dubious. The unnumbered collection of Sellow (SP!, RB!, US!), all characteristic plants, is originally from B. The labels - as so often with Sellow's collections - are uninformative, simply bearing the word "Rio". Whereas this might refer to Rio de Janeiro there is no firm reason why it should. The possibility of *L. aurea* having occurred in the region of Rio de Janeiro - then Brazil's principal port - is supported by the label of Glaziou 12278 (K!, US!), "environs de Rio de Janeiro", but the unreliability of Glaziou's labels is notorious: "Skepticism about Glaziou data is perhaps in order when his collection "locality" is the only evidence of disjunct species distribution or when a species is known only from a Glaziou collection" (Wurdack 1970). The same doubt applies to Glaziou 20120 (K!, US! under *Aeluroides*, labelled "St. Paul" - presumably São Paulo, though whether this refers to city or State is not clear. The climate of the interior of the State would seem to be more suitable for the species, but the European element in the population of the city of São Paulo may point to ornamental introduction. The last of the Brazilian collections found to date is Capell s.n. (RB! 138377), collected according to the label in Nova Friburgo, RJ, in 1950. Yet the other two collections by Pe. Capell, both in RB and dated 1949 and 1954, are from the environs of Barcelona. It may be asked whether this is a mislabelled Catalan collection, or whether the collector himself may have introduced the species accidentally or, more probably, as an ornamental. No other collections from the same region have so far appeared, any more than the plant has been rediscovered in or near Rio de Janeiro.

Muhlenbach (1979) in a fascinating introduction to his paper on Railroad Flora, notes that Flygare (1768) had already recognized commerce as one of the ways by which the dispersal of plants may occur. The common Brazilian grass species *Melinis minutiflora* Beauv. has been traditionally regarded as a true epianthropochore, the propagules having been introduced in the 17th or 18th century adhering to the feet of slaves; thus a grass of African origin quickly became naturalized. More probable is the suggestion of Sendulsky (pers. comm.) regarding African

species of *Brachiaria* Griseb., namely that the grass was used for between-decks packing in slave ships. On arrival, it would simply be thrown away, thus permitting a second stage in dispersal by a number of means.

Within the general notion of "commerce", Muhlenbach (l.c.) cites, for the early 19th century, the transmission of propagules as impurities in agricultural products, and in the ballast used by ships. "Ballast often consisted of earth, rocks, or sand. This would often be shifted from one harbour to another as needed, and the same material might easily travel to many different parts of the world. Considering the material most often used as ballast, it is no wonder that it contained fruits, seeds, rhizomes, bulbs etc. Consequently, rich "ballast floras" frequently developed, and many "ballast plants" were widely distributed in many countries" (Muhlenbach 1979). Until independence in 1822, Brazil formed part of the Portuguese colonial empire, and maintained intensive commercial links with the mother country - from which *Lamarckia* could very well have been imported. The substantial foreign communities living and trading in Rio de Janeiro at the beginning of the 19th century may even have introduced *L. aurea* as an ornamental; this seems unlikely, but a number of plants were transferred to Brazil in this way.

Adventives of this type are frequently ephemeral - especially annuals - due to change of climate, soil conditions, or absence of pollinating insects - though the last of these common causes should hardly have effected the establishment of *Lamarckia* in Brazil. The species has adapted itself to harsher - though possibly not wetter - climates than Brazil, and continues to occur as an alien in various parts of the world well outside its zone of origin. With regard to Brazil, it may for the time being simply be stated that: collections of *Lamarckia aurea* nominally from Brazil exist, all before 1954, all but one in the last century; all such collections are inexplicit or dubious in their labelling; even the most optimistic sources (e.g. Smith, Wasshausen & Klein (1981-1982), who list for the State of Santa Catarina numerous species not recorded for that State, with the explanation that they may reasonably be expected to occur) make no reference to recent occurrence of the species; no active collector consulted has seen or collected *L. aurea* in recent years, although the species may be expected, on the basis of its known habits of dissemination and its decorative value, to appear at least briefly and from time to time. The plant is at present to be defined as a rare and perhaps doubtful adventive; the cooperation of herbarium staff and collectors is necessary to establish its status with greater clarity.

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Figs. 1-4 - *Lamarckia aurea* (L.) Moench: 1 - Habit of plant, 2 - Fascicle of spikelets, including awned fertile spikelet, awned but reduced fertile spikelet, and sterile spikelets, 3 - Fertile spikelet, 4 - Sterile spikelet, consisting of glumes and lemmas only. (Sellow s.n.).

Figs. 1-4 - Lamarckia aurea (L.) Moench: 1 - Hábito, 2 - Fascículo de espiguetas, incluindo espiguetas férteis aristadas, espiguetas férteis aristadas mas reduzidas, e espiguetas estéreis, 3 - Espiguetas férteis, 4 - Espiguetas estéreis, consistindo de glumas e lemas somente. (Sellow s.n.).

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