

FILIP VERLOOVE &amp; MARC REYNDERS

## Studies in the genus *Paspalum* (*Panicaceae*, *Poaceae*) in Europe – 1. *Paspalum distichum* subsp. *paucispicatum*, an overlooked taxon in France

### Abstract

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The present paper reports about the naturalization of the Mexican grass species *Paspalum paucispicatum* in the Loire valley in France. The species has long been confused with and erroneously referred to as *P. dilatatum*, *P. distichum*, *P. longipilum* or *P. pubiflorum*. A revision of several relevant herbaria enabled us to reconstruct the species' invasion history in France. Main diacritic features are given and an identification key for *Paspalum* in France is presented. *P. paucispicatum*, of a debated taxonomic rank in its area of origin but clearly delimited in France, is probably better treated as a subspecies of *P. distichum*; hence the new combination at subspecific level is validated.

Key words: *Gramineae*, grasses, *Paspalum paucispicatum*, taxonomy, Mexico, neophytes.

### Introduction

In August 2000, while botanizing on the sandy banks of the Loire river near Monteaux (France, dep. Loir-et-Cher), the first author came across a luxurious population of an unknown *Paspalum* species. The plants did not correspond with any of the known taxa of this genus in France at that time. They are obviously rhizomatous-stoloniferous, like *P. distichum* L., but their general habit is quite different: culms are clearly ascending to erect and rather stout (vs. creeping and rather slender) and the panicles are racemose with usually three branches (vs. conjugate with usually two branches). Further examination revealed additional morphological peculiarities and the determination turned out to be straightforward using a monograph dealing with the North American species of *Paspalum* (Chase 1929). The plants from Monteaux definitely belong to *Paspalum paucispicatum* Vasey, native to Mexico in an area ranging from Sonora to Oaxaca (Hitchcock 1950).

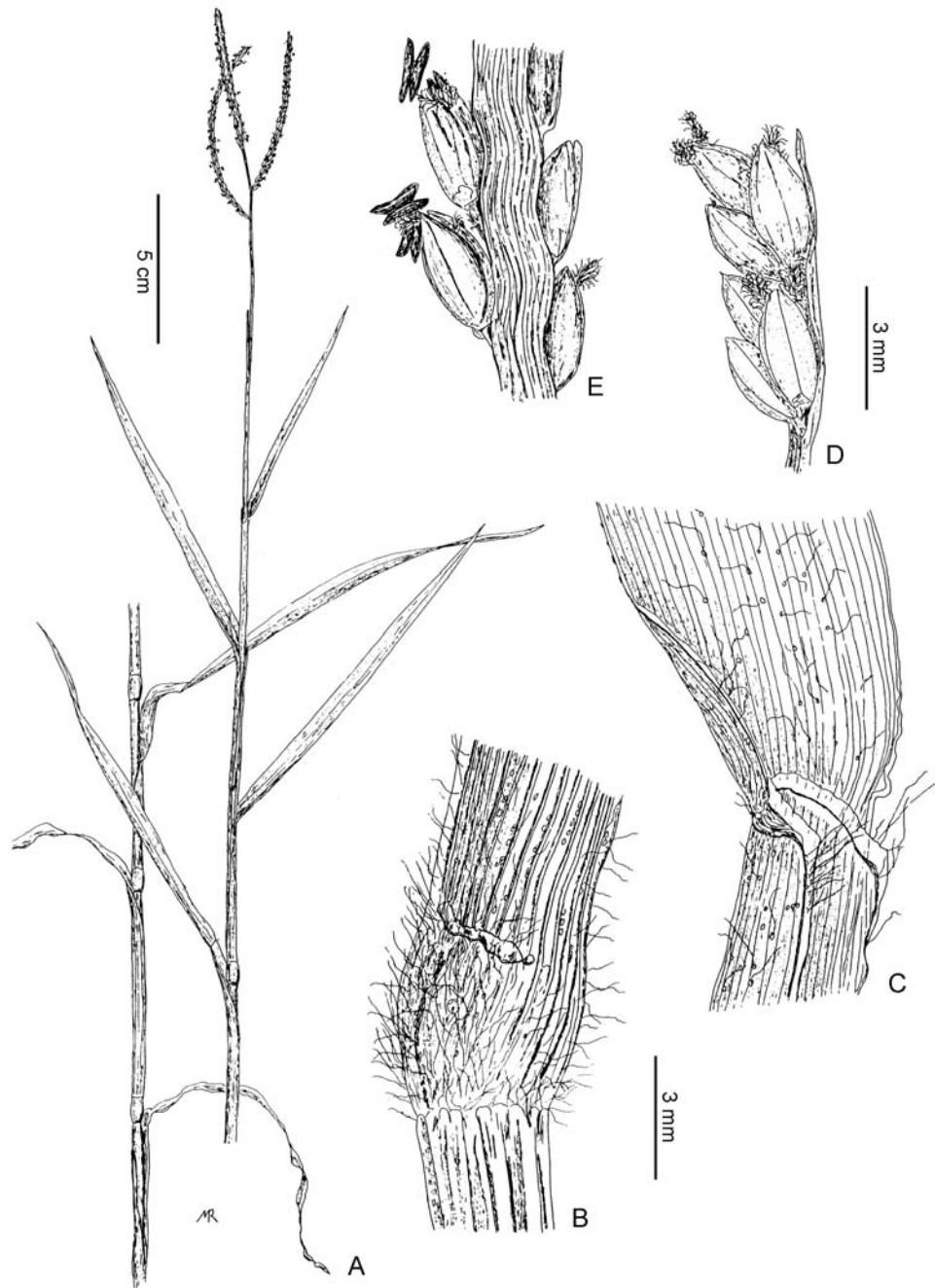


Fig. 1. *Paspalum distichum* subsp. *paucispicatum* – A: habit; B: node; C: leaf sheath with ligula; D, E: spikelets grouped pairwise. – Drawn by Marc Reynders after Verloove 4489.

## Results

Our study of numerous collections of *Paspalum* in the past years brought to light several specimens of *P. paucispicatum* (sub *P. dilatatum* Poir., *P. distichum*, *P. longipilum* Nash and *P. pubiflorum* E. Fourn.) from France. All specimens were collected in the Loire valley but dispersed over an overall distance of more than 200 km with the oldest records dating back at least to 1929 (see below). A bibliographic study revealed that in various publications dealing with the riparian flora of the Loire valley (or covering the French grass flora as a whole; see Kerguélen 1975, 1979), allusion has been made to the aberrant populations of *Paspalum* for many decades (at least since Debray 1942 onwards and most recently by Dupont 2001).

Vasey (1893) described *Paspalum paucispicatum* as a species new to science, based on a collection of E. Palmer from Guadalajara (Mexico). Subsequently it was accepted at specific level by many other authors (e.g., Chase 1929). At present most taxonomists tend to consider *P. paucispicatum* conspecific with the variable *P. distichum* (McVaugh 1983, Beetle 1999, Zuloaga & al. 2003, see on the contrary Espejo Serna & Lopez Ferrari 2000). McVaugh (1983) states that “it does not seem possible to distinguish *P. paucispicatum* [from *P. distichum*] in Nueva Galicia”. In Mexico, where both taxa always have co-existed, they probably intergrade. In France, however, both taxa were introduced independently and at various, relatively recent times and their identification usually appears to be clear-cut. Most likely this is due to their relative isolation (*P. distichum* being more concentrated in the southern parts of France) which has prevented an exchange of genes between both taxa so far. It is because of the differences to *P. distichum* that the plants in question cannot be identified with identification keys of any European flora, which has led to the numerous misidentification in the literature and the herbaria.

Since the populations from the Loire river are so characteristic and well differentiated from *P. distichum* (Table 1), they deserve formal taxonomic recognition, perhaps not at specific but surely at subspecific level.

***Paspalum distichum* subsp. *paucispicatum*** (Vasey) F. Verloove & M. Reynders, **comb. & stat. nov.** ≡ *Paspalum paucispicatum* Vasey in Contr. U.S. Natl. Herb. 1(8): 281. 1893.  
Holotype: Mexico, Jalisco, Guadalajara, Jul.-Oct. 1886, *E. Palmer 243* (US 2855772; isotypes: MO 2744753, MO 2739274, P) – Fig. 1.

Stout *rhizomatous perennial*, rooting at the lower nodes, with culms ascending to erect, up to 70 cm high, all nodes distinctly hairy. *Leaf blades* up to 20 cm long and 10 mm wide, softly but densely hairy on adaxial and abaxial side with patent to appressed (usually bulbous-based) hairs, sheaths hairy with patent bulbous-based hairs, ligule membranous, 0.5-1 mm long. *Inflorescence* racemose, usually with 3 (more rarely 2 or 4) erect to ascending branches, these up to 8 cm long, rachis c. 1.5 mm wide. *Spikelets* paired (appearing in 4 rows), 3 mm long, 1.5 mm wide; lower glume usually present, upper glume and sterile lemma equal in length, the upper glume sparsely and shortly pubescent (Fig. 1).

Table 1. Main diacritic features of *Paspalum distichum* and *P. paucispicatum*.

	<i>P. paucispicatum</i>	<i>P. distichum</i>
Culms	ascending to erect	usually creeping
Leaves	blades and sheaths pubescent with bulbous-based hairs; blades up to 20 cm long	blades glabrous, usually up to 12 cm long
Nodes	all densely pubescent	those of the flowering stems (not rooting) glabrous
Inflorescence	racemose with (2-)3 branches	conjugate with 2 branches (very rarely racemose with 3 branches)
Spikelets	paired throughout	solitary (sometimes some paired)

*Notes.* – Voucher specimens of *Paspalum paucispicatum* were found in the revised herbaria in the collections of *P. dilatatum*, *P. distichum* and *P. pubiflorum*. With the former it shares the upright, stout habit but the margins of its spikelets are never long-pilose and its spikelets are at least twice as long as broad. In *P. pubiflorum* the lower glume is always absent and the upper glume and sterile lemma are more prominently puberulous. The concerned plants have also been referred to as *P. longipilum* (Debray 1942), a taxon with broadly oval, solitary spikelets. Confusion is more likely with *P. distichum* s.str.; their main diacritic features are compared in Table 1.

In his exhaustive study of the morphology and chorology of *Paspalum distichum* and *P. vaginatum* in France, Debray (1969) already discussed in detail the aberrant plants from the Loire valley. He suggested their close affinity to *P. paucispicatum* but finally rejected this possibility after having studied three sheets of this species from the locus classicus (probably including the isotype held at P). He found two diacritic features distinguishing the latter from the Loire plants: the absence of a lower glume and a much more pronounced puberulence of the sterile lemma. However, “some of the sheets of *Palmer 243*” actually represent *P. pubiflorum* (McVaugh 1983) and so apparently Debray was led astray by misidentified material of *P. pubiflorum*, whereas the plants from the Loire valley perfectly match Vasey’s original description of *P. paucispicatum*.

*Distribution history and distribution pattern in France.* – The first confirmed appearance of *Paspalum distichum* subsp. *paucispicatum* in the Loire valley dates back to 1929 when this taxon was found at Tours (which seems to be, indeed, the area of initial introduction). In the same year several other records came to light from the very same area (Varennes-sur-Loire, Sainte-Radegonde-en-Touraine; see Debray 1969) which suggests an introduction well before 1929. Subsequently, this taxon was collected at numerous additional localities downstream (see Debray 1969 and the list of revised specimens below), then it appeared upstream, first, in 1931, around Saumur (1931) and in the following decades up to Chaumont-sur-Loire. This extension

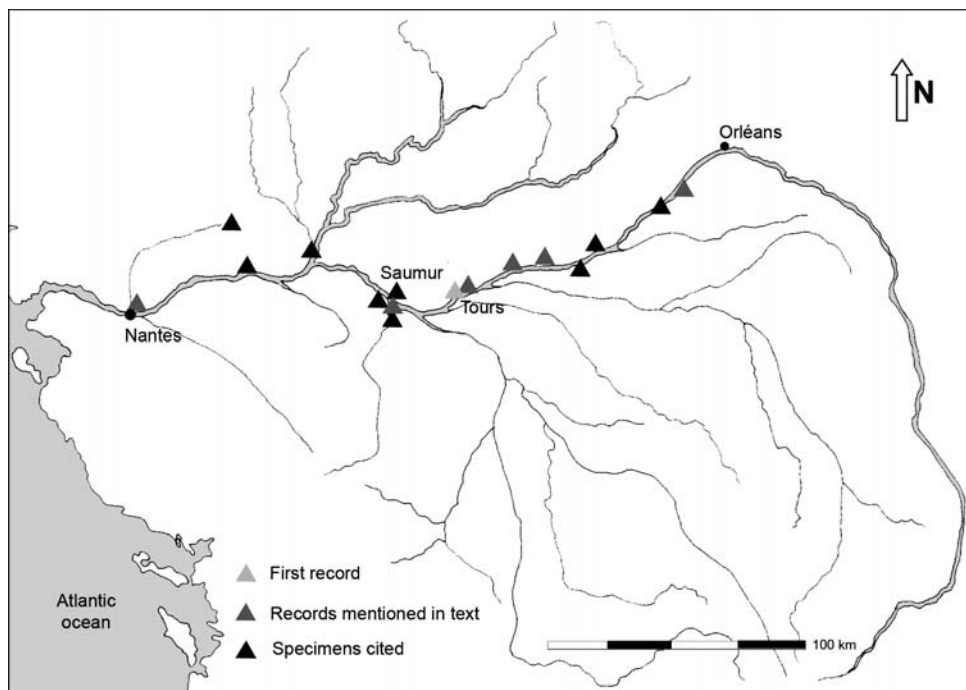


Fig. 2. Distribution of *Paspalum distichum* subsp. *paucispicatum* in the Loire valley.

upstream must have been the result of dispersal, for example, by migrating birds and perhaps also through riverine traffic.

After having studied numerous voucher specimens of *Paspalum* from France it became evident that at present *P. distichum* subsp. *paucispicatum* is very well naturalized in the Loire valley (Fig. 2). The range extends at least from Thouaré (Nantes, dep. Loire-Atlantique) in the west upstream to Chaumont-sur-Loire (dep. Loir-et-Cher) in the east, covering an overall distance of 200-250 km. In more recent times it migrated, probably also as a result of ornithochory, to suitable areas away from but close to the Loire river: in 1975 plants were collected along the Maine river near Angers and in 1993 on the borders of the “Étang de la Provostière” near Riaillé.

*Paspalum distichum* subsp. *paucispicatum* is likely to occur elsewhere in the aforementioned area but at present seems to be absent upstream from Chaumont-sur-Loire (negative observations by the first author in the past years around Blois, Beaugency, Orléans, Jargeau, etc.).

From the studied material *Paspalum distichum* subsp. *paucispicatum* is clearly restricted to riparian habitats (river banks, less frequently lake shores), usually on wet, sandy and rather eutrophic soils. Plants were regularly seen in open, shallow water. Thus subsp. *paucispicatum* seems to prefer similar habitats as subsp. *distichum*. Similarly with subsp. *distichum*, subsp. *paucispicatum* sometimes tends to form almost pure, monospecific stands and both also seem to share a local tendency towards invasive behaviour.

*Specimens seen.* – FRANCE: INDRE-ET-LOIRE: Amboise, graviers de la Loire, 15.8.1971, *P. Sotiaux* (BR). – LOIR-ET-CHER: Veuves, Loire, 15.8.1971, *Sotiaux* (BR); Monteaux (NE of Amboise), sandy border of Loire river, 13.8.2000, *F. Verloove 4489* (BR, LG, herb. Verloove). – LOIRE-ATLANTIQUE: Près du Pont Ancénis, berges de la Loire, 27.8.1975, *H. G. Rabyns 4282* (BR); Riaillé, étang de la Provostière, 8.7.1993, *P. Dupont* (LG). – MAINE-ET-LOIRE: Saumur, berges de la Loire, pas rare (déjà observé à Saumur en 1941 par M. M. Debray), 21. & 30.8.1962, *E. Contré (Soc. Fr. Ech. Pl. Vasc. 4183)* (BR); La Croix-de-la-Vaulte, près de Saumur, alluvions de la rive droite de la Loire, 25.8.1962, *H. Bouby 5796ter* (P); Saumur, en amont du pont du chemin de fer, alluvions de la rive gauche de la Loire, 30.8.1962, *H. Bouby 5796* (P); Angers, rives vaseuses du Maine, 26.8.1975, *L. Delvosalle* (LG).

#### Key to the naturalized taxa of *Paspalum* in France

An additional taxon, *Paspalum setaceum* Michx., was collected as an ephemeral adventive around Marseille in the 19th century (BR!) and is not included in the identification key.

1. Densely caespitose perennial without stolons; inflorescence racemose with 2-7 branches; margins of lower lemma and upper glume densely pilose . . . . . *P. dilatatum*
- Stoloniferous-rhizomatous perennial; inflorescence conjugate or racemose with up to 3 branches; margins of lower lemma and upper glume not densely pilose . . . . . 2
2. Upper glume glabrous on the back; lower glume always absent . . . . . *P. vaginatum*
- Upper glume sparsely short pubescent on the back; lower glume well developed, at least in some spikelets . . . . . 3
3. Inflorescence racemose with (2-)3 branches; spikelets paired; all nodes densely hairy; leaf blades and sheaths pubescent with bulbous-based hairs; culms ascending to erect . . . . . *P. distichum* subsp. *paucispicatum*
- Inflorescence usually conjugate; spikelets usually solitary; nodes of the flowering stems glabrous; leaf blades and sheaths glabrous; culms usually creeping . . . . . *P. distichum* subsp. *distichum*

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## Addresses of the authors:

Filip Verloove, National Botanic Garden, Domein van Bouchout, B-1860 Meise, Belgium; e-mail: filip.verloove@br.fgov.be

Marc Reynders, University of Ghent, Department of Biology, Research Group Spermatophytes, K. L. Ledeganckstraat 35, B-9000 Gent, Belgium; e-mail: Marc.Reynders@Ugent.be