

# TAXONOMICAL NOTES ON THE GENUS *PIPTATHERUM* P. BEAUV. (POACEAE) IN IRAN

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*Piptatherum denaense* is described as a new species from south west of Iran, Dena Mountain. It is close to *P. laterale* but differs from it by having glabrous lemma in lower half and toward the apex, narrower vegetative shoots and unbearded anthers. *Piptatherum holciforme* subsp. *holciforme* var. *glabrum* is not accepted as a distinct variety. *Piptatherum sphacelatum* formerly known as a synonym of *P. molinioides* is established as a separate species due to having distinct morphological characters as well as molecular differences based on literature. Thus, the number of taxa in the genus *Piptatherum* changes to 9 species, 2 subspecies and 4 varieties in Iran. An identification key to *Piptatherum* taxa occurring in Iran is provided. The distribution map of *P. denaense* with *P. laterale* subsp. *laterale* and the illustration of the new species are included.

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**Key words:** *Piptatherum*; Poaceae; new species; new synonym; reestablished species; Iran

نکاتی در مورد جنس *Piptatherum* P. Beauv. (Poaceae) در ایران

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*Piptatherum denaense* به‌عنوان گونه‌ای جدید از کوه دنا در جنوب غرب ایران شرح داده می‌شود. این گونه با داشتن پوشینه بدون کرک در بخش تحتانی و انتهایی، بساک بدون کرک و برگ‌های رویشی باریک از گونه نزدیک به آن، *P. laterale*، تفاوت دارد. *P. holciforme* subsp. *glabrum* var. *glabrum* به‌عنوان یک واریته مشخص مورد تایید قرار نمی‌گیرد. *P. sphacelatum* که قبلا با گونه *P. molinioides* مترداف شده بود با داشتن صفات مورفولوژیکی مشخص و تفاوت‌های مولکولی به‌عنوان یک گونه مستقل شناخته می‌شود. در مجموع تعداد تاکزون‌های جنس *Piptatherum* در ایران به ۹ گونه، ۲ زیرگونه و ۴ واریته تغییر می‌یابد. کلید شناسایی تاکزون‌های موجود در ایران، نقشه پراکنش *P. denaense*، *P. laterale* subsp. *laterale* و تصویر گونه جدید ارائه می‌شود.

## INTRODUCTION

*Piptatherum* P. Beauv. is a genus with high degree of variability, referred to tribe *Stipeae* Domurt, and has been considered closely related to *Oryzopsis* Mich. The taxonomical study of the genus was started by Linnaeus in 1753 and 1762 as *Agrostis miliacea* L. and *Milium paradoxum* L. The genus *Piptatherum* with a series of morphological floret characters such as coriaceous lemma and palea, caducous awn and emarginated tip of lemma was introduced by Palisot de Beauvieux in 1812. Also, Boissier (1884) in *Flora Orientalis* described his samples as *Piptatherum* P. Beauv. In the other hand, the genus *Oryzopsis* was found by Michoux

(1803) and according to Trinus and Ruprecht (1842) with having a distinctive ring of long hairs at the base of lemma was separated from *Piptatherum* P. Beauv. Over times, various authors have used one of these two names. The name of *Piptatherum* was used by Roshevitz (1951), Freitag (1975) and Tzvelev (1976). Bor (1970) in *Flora Iranica* used the name *Oryzopsis* as did Bentham and Hooker (1880), Hackel (1887) and Trinus (1834). Freitag (1975) in his study of *Piptatherum* in south west Asia, made a detailed analysis of the morphological differences between florets of the two genera. He referred 22 species occurring in SW Asia to three sections: sect. *Miliacea*

Roshev. ex Freitag, sect. *Virescentia* Roshev. ex Freitag and sect. *Piptatherum*, of these two sections: *Virescentia* and *Piptatherum* occur in Iran. The lines of the species of two genera were clarified by Komashenko & al. (2011) in the last phylogenetic study of the genera *Piptatherum* and *Oryzopsis*. The name of *Piptatherum* and the morphological species concept are used in the present work, mainly in line with that of Freitag (1975).

During determination of 275 specimens of *Piptatherum* mainly deposited at TARI, FUMH, IRAN and other herbaria of the Ministry of the Jihad-e Agricultur, 12 specimens were used to compose a new species description. All specimens were critically examined based on Bor (1970), Freitag (1975), Tzvelev (1977) and Tan (1985).

### New species

***Piptatherum denaense* Hamzeh'ee and Assadi, sp. nov.**  
(fig. 1).

*P. denaense* is distinguished from *P. laterale* subsp. *laterale* by having glabrous lemma in lower half and apex (hairy throughout in *P. laterale* subsp. *laterale*), narrower vegetative shoots (wider in *P. laterale* subsp. *laterale*) and unbearded anthers (bearded in *P. laterale* subsp. *laterale*).

*Typus*: Esfahan: N. side of Kuh-e Dena, above the village Noghol, 3000-3500 m a.s.l., 16 July 1983, Assadi and Abouhamzeh 46117 (holotypus TARI).

Densely tufted, culms 51-69 cm high, 2-3 noded, glabrous. Sheaths glabrous; ligules at the culm leaves 2.2-5.7 mm long, obtuse or acutish, at the vegetative shoots 2-4 mm long, obtuse to acute, often lacerated; blades involute or rarely flat, grayish-green, at the culm leaves up to 11 cm × 0.6-1.3 mm, at the vegetative shoots up to 16 cm × 0.3-0.6 mm; upper surface pilose to scaberulous, or rarely glabrous. Panicle lax or ± contracted, 8-15.5 cm long, 1.5-4 cm wide; branches ascending, erect, or ± spreading, paired or solitary, scabrous; the longest less than 1/2 of the panicle. Spikletes lanceolate or lanceolate-ovate, 6.5-8.2 mm long. Glumes pale green on the back and broad golden at the margins and tip, 5-7 nerved. Lemma at mature fruit oblanceolate to almost lanceolate-ovate in outline, 4.5-5.5 × 1.1-1.3 (-1.4) mm, with a short and acute apex, covered with slightly ascending to erect 0.1-0.3 mm long white hairs, except for the apex, along the dorsal line and margins in the lower part glabrous; scar transversely elliptic; awn 5.3-6.5 mm long, 3-4.5 mm exerted, terminal, straight or slightly bent, caducous. Anthers 2.8-3.5 mm long, yellow or purplish, not bearded.

*Phenology*: Flowering in May, fruiting in June to July.

*Distribution and habitat*: *Piptatherum denaense* is an endemic species to Iran. Its distribution is confined to the area from Chahrmahl va Bakhtiari to Fars Mts. in the south west and center of Iran while its related species, i.e. *P. laterale* subsp. *laterale* is distributed in most parts of Iran (fig. 2). Individuals of this species are scattered on calcareous screes, rocky mountains, alpine and subalpine areas in xerophytic steppes of *Astragalus* and *Onobrychis* cushions.

The species closest to new species is *P. laterale* (Regel.) Roshev. subsp. *laterale*. *P. denaense* is easily distinguished from *P. laterale* subsp. *laterale* by having glabrous lemma in lower half and apex, narrower vegetative shoots (0.3-0.6 mm) and unbearded anthers. In *P. laterale* lemma is hairy throughout, vegetative shoots are wider (0.7-2 mm) and anthers are bearded.

*Additional specimens examined (Paratypes)*: Fars: Road of Sepidan to Yasuj, to Mahparviz, 2220 m, 2009.5.26, Hamzeh'ee 91658; Eghlid, N slopes of Bol Mountain, 2700-3000 m, 16.06.2002, Assadi & Ranjbar 83031; Fasa, Kharman Kuh, 2900 m, 6.6.1983, V. Mozaffarian 46906; 25 km S. E. of Fasa, Salou village, Kuh-e Raz, 1600-2200 m, 5.6.1983, V. Mozaffarian 46801; 9 km NW Ardekan, 2620 m, 13.7.1959, H. Pabot 2386; same location, 2620 m, 13.7.1959, H. Pabot 2385; 76 km N.W. Ardekan, 2300 m, 14.7.59, H. Pabot 2425; Ardekan, 2500 m, 18.7.1983, Assadi & Abouhamzeh 46307; 20 km from Estahbanat to Neiriz, S. of Daryach-e Bakhtegan, 1750 m, 8.6.1983, V. Mozaffarian 47118; Chaharlmahal va Bakhtiari: Brojen, Boldaji, Kuh-e Chiro, Bagh-e Chiro, 2200-2600 m, 1.7.1986, V. Mozaffarian 57319; Kohgilouyeh va BoirAhmad: ca. 50 km E. of Dehdasht, Kuh-e Nil, 2400-3200 m, 21.7.1983, Assadi & Abouhamzeh 46477; Road from Yasuj to Kakan, N. slope of Kuh-e Kachion, 2500-2900 m, 29.6.1993, V. Mozaffarian 72163. All specimens are preserved at TARI.

*Etymology*: The specific epithet refers to Dena Mountain in SW of Iran, where the species is well distributed.

### New synonym

***Piptatherum holciforme* (M. Bieb.) Roem. & Schult.** subsp. *holciforme* var. *holciforme*, Syst. Veg. 2: 238 (187).

Syn.: *P. holciforme* (M. Beieb.) Roem. & Schult. subsp. *holciforme* var. *glabrum* Freitag (1975, P 372).  
*Type*: Turkey: Konya, Sultandagh in saxosis et



Fig. 1. Illustration of *Piptatherum denaense* (Assadi and Abouhamzeh 46117, TARI). A, spikelet; B, glumes; C, lemma; D, glabrous anther; E, ligule. Scales: A-C & E=X7; D=X12.

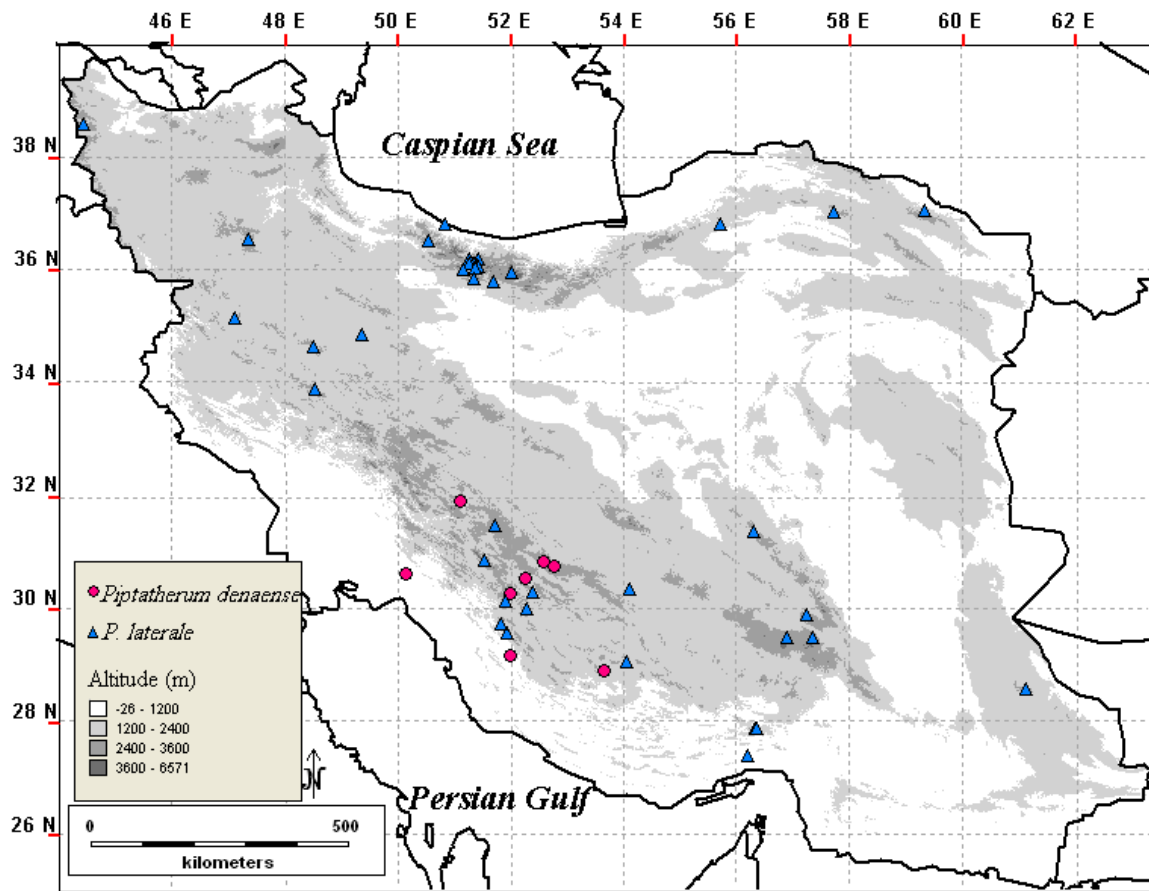


Fig. 2. Distribution map of *Piptatherum denaense* and *P. laterale* subsp. *laterale* in Iran.

rupestribus prope Aksehir, 1100 m, 14 vi 1899, Bornmüller 5639 (holo. B, iso. LE).

Freitag (1975) introduced *P. holciforme* subsp. *holciforme* var. *glabrum* as a new variety from Turkey. Based on Freitag (1975), this variety can be separated from var. *holciforme* by having completely glabrous lemma. During the study and determination of the specimens belonging to *P. holciforme* subsp. *holciforme* at the TARI herbarium, the authors countered to a specimen were collected by former author from N.W. of Iran, near Turkey and adjacent Republic of Azerbaijan. This specimen has both glabrous and hairy lemma (fig. 3).

Since, only the presence or absence of lemma indumentum is separating two varieties (Freitag 1975), both of them are regarded as the same and treated as synonymous.

*Specimen examined:* E. Azerbaijan: Arasbaran Protected Area, Vaighan to Shabkhaneh, 1300 m, Hamzeh'ee & Asri 81949 (TARI).

**Reestablished species**

*Piptatherum sphacelatum* (Boiss. & Buhse) Boiss., Fl. Or. 5: 508 (1884).

*Type:* In montibus persiae mediae ad pagum Ssou inter Ispahan et Kaschan, Buhse.

Among the species of the genus *Piptatherum* in Iran, many specimens with hairs exceeding the lemma are distinct from the other species. Based on Freitag (1975) and the broad concept of species, all of these are identified under *P. molinioides* Boiss., an endemic species of Iran, which has been synonymus to another endemic speices of Iran, *P. sphacelatum* Boiss.. At first glance, as correctly noted by Boissier (1884), in this complex, there are two sets of materials, *P. molinioides* with closed panicle (fig. 4) and *P. sphacelatum* with more or less lax panicle (fig. 5). During the study of a large number of specimens belonging to both species, the authors found two tufts of hairs at the base of lemma in specimens of *P. sphacelatum* group (fig. 6), not known before. On the other hand, phylogenetic study of this genus by



Fig. 3. *Piptatherum holciforme* subsp. *holciforme* var. *holciforme*. A, hairy lemma; B, glabrous lemma.



Fig. 4. *Piptatherum molinioides* with closed panicle.



Fig. 5. *Piptatherum sphacelatum* with lax panicle.

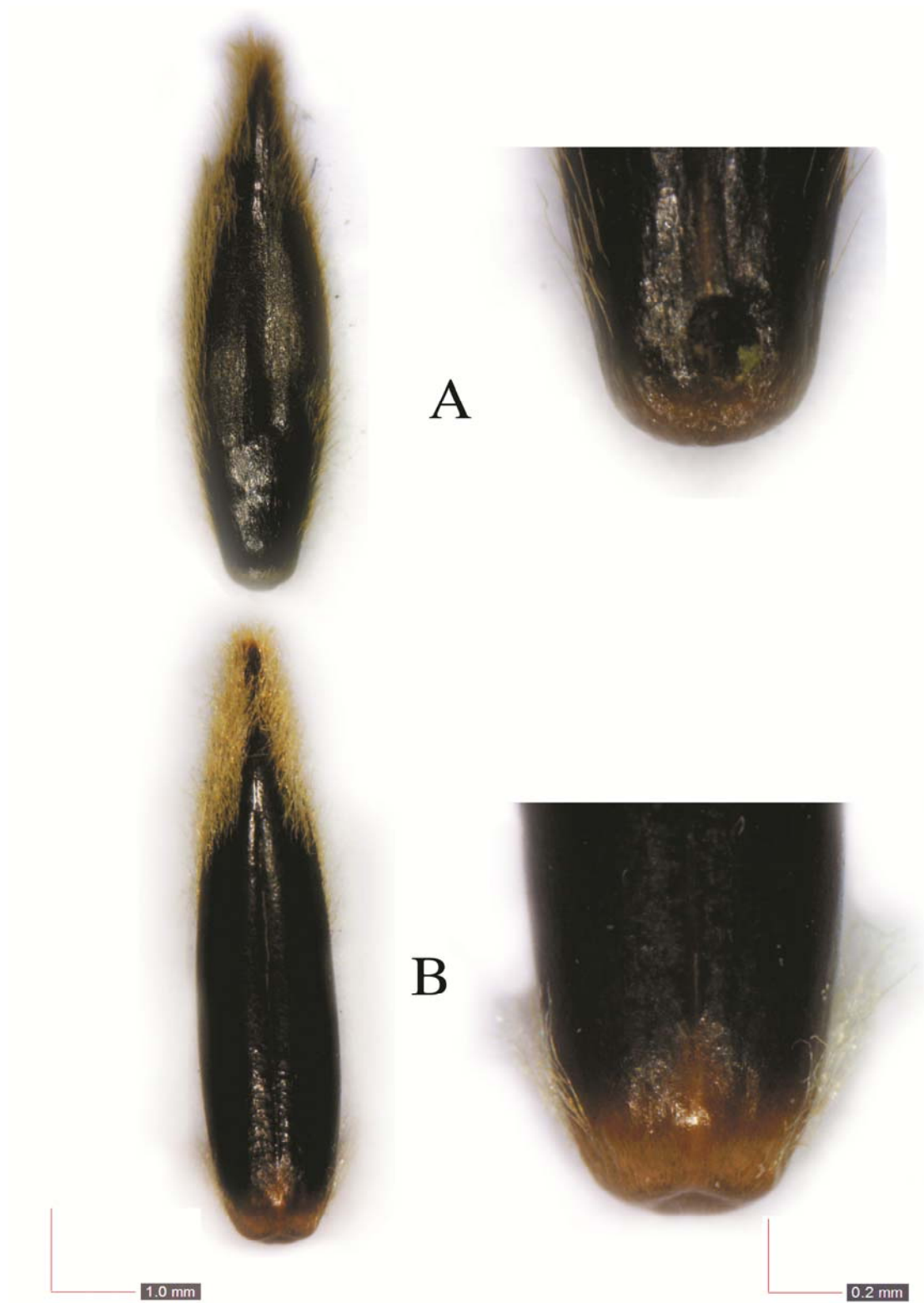


Fig. 6. A, Lemma of *Piptatherum sphacelatum* with two tufts of hairs at the base; B, lemma of *P. molinioides* without tufts of hairs.



Romaschenko & al. (2011) showed that the two species are located near each other but separated into two different branches. Thus, for these reasons, we came to the conclusion that *P. sphacelatum* is an independent species from *P. molinioides*.

### Key to the species of *Piptatherum* in Iran

1. All lemmas completely glabrous or only with 2 basal tufts of hairs 2  
-All lemmas hairy throughout or partly, rarely some lemmas glabrous 3
2. Spikelet 7-9 mm long; lemma 4.5-5.2 mm long; completely glabrous *P. platyanthum* var. *glabrum*  
-Spikelet 5.5-7.5 mm long; lemma 2.5-4 mm long; only with two basal tufts of hairs *P. vicarium*
3. Ligule very short, up to 0.2-0.3 mm long; sheath ciliate at the margins. Spikelets 3.4-4.3 mm long  
*P. virescens*  
-Ligule longer than 1.2 mm; sheath not ciliate at the margins. Spikelet longer than 6 mm 4
4. Awn longer than 5 mm 5  
-Awn shorter than 5 mm 9
5. Panicle very lax, the longest branch at least 1/2 length of panicle 6  
-Panicle contracted or ± lax, the longest branch less than 1/2 length of panicle 8
6. Lemma 3.5-3.9 mm long *P. songoricum*  
-Lemma 4.9-8 mm long (*P. holciforme*)...7
7. Spikelet 8-15 mm long; lemma 6.2-8 mm long; awn 10-15 mm long *P. holciforme* subsp. *longiglume*  
-Spikelet 6.5-10 mm long; lemma 4.9-7 mm long; awn 4.5-7 mm long *P. holciforme* subsp. *holciforme*
8. Lemma narrow lanceolate, hairy throughout. Anther bearded *P. laterale*  
-Lemma oblanceolate to lanceolate-ovate, glabrous toward the apex and base. Anther not bearded *P. denaense*
9. Hairs of lemma exceeding from the apex 10  
-Hairs of lemma not exceeding from the apex 11
10. Panicle contracted; lemma without two basal tufts of hairs *P. molinioides*  
-Panicle lax; lemma with two basal tufts of hairs *P. sphacelatum*
11. Lemma narrow lanceolate, acute, 0.9-1.3 (1.4) mm wide *P. laterale*  
-Lemma ovate to elliptic, obtuse, 1.4-2 mm wide *P. platyanthum* var. *platyanthum*

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