

## *Orinus longiglumis* (Poaceae: Chloridoideae), a new species from Xizang (Tibet), China

Xu Su<sup>1,2</sup> & Lian-Bing Cai<sup>1,\*</sup>

<sup>1)</sup> Northwest Plateau Institute of Biology, the Chinese Academy of Sciences, Xining, Qinghai 810001, China (\*corresponding author's e-mail: cailb@nwipb.ac.cn)

<sup>2)</sup> Graduate School of the Chinese Academy of Sciences, Beijing 100049, China

Received 9 Aug. 2007, revised version received 10 Dec. 2007, accepted 14 Dec. 2007

Su, X. & Cai, L. B. 2009: *Orinus longiglumis* (Poaceae: Chloridoideae), a new species from Xizang (Tibet), China. — *Ann. Bot. Fennici* 46: 143–147.

*Orinus longiglumis* L.B. Cai & X. Su *sp. nova* (Poaceae) is described and illustrated. It is endemic to the south-central part of Xizang Zizhiqu (Tibet), China, occurring at an elevation of 3040 to 3650 m on sandy soils. It resembles *O. thoroldii*, but differs from that species by the commonly hairy culms and leaves, longer panicles, longer glumes that are sparsely spinulose and pilose, longer anthers, and the paleas that are shorter than the lemmas. *Orinus longiglumis* differs from all other known species of *Orinus* by having glumes that are longer than or subequal to the adjacent florets.

Key words: new species, *Orinus*, Poaceae, taxonomy

*Orinus*, a genus of only perennial grasses is placed in Poaceae subfamily Chloridoideae and was established by Hitchcock (1933). Five names have been attributed to the genus, but only four species are currently accepted: *O. thoroldii* (syn. *O. arenicola*), *O. kokonorica*, *O. anomala*, and *O. tibeticus* (Chen & Phillips 2006). These four species are distributed in Gansu, Sichuan, Qinghai-Xizang Plateau and Kashmir plateaus (Keng 1959, Bor 1960, Liou 1987, Yang 1990, Zhao & Li 1994, Lu 1999, Chen & Phillips 2006) and can be found growing primarily in river valleys, along river banks, lakesides, mountain slopes, and grasslands between 2230–5200 m. The genus is characterized by having long, scaly rhizomes, culms that have many nodes and leaf sheaths that are longer than the internodes. The panicles are sparsely flowered with a few to several racemose branches borne singly at

each node. The pedicelled spikelets bear slightly keeled glumes with one or three veins, have ± pilose 3-veined lemmas that have dentate apices, paleas that are longer or shorter than the lemmas, and thin anthers. The caryopses are cylindrical and narrowly oblong. Members of this genus are important forage grasses and the scaly rhizomes are well adapted for survival in shifting sands. Therefore, these species are good stabilizers of dunes and wind blown soils at high altitudes.

*Orinus* has been the primary subject of the authors' work in recent years. One hundred twenty-three specimens were surveyed primarily from the Qinghai-Xizang Plateau and the contiguous zones from the following herbaria: CDBI, HNWP, KUN, LZAH, LZU, PE, SZ, WUK, XJA, XJBI, XZ, XZDC. Several of those specimens were misidentified and appeared to belong to an unrecognized species of *Orinus*.



**Fig. 1.** *Orinus longiglumis* (from paratype Xizang Medic. Pl. Exped. 4415, drawn by Mr. Song Wen-Zhu). — **A:** Mature plant with rhizomes. — **B:** Junction of sheath and blade to show ligule. — **C:** Spikelet. — **D:** Lower glume. — **E:** Upper glume. — **F:** Dorsal view of the lower floret. — **G:** Ventral view of the lower floret. — **H:** Anthers. — **I:** Caryopsis.

In the autumn of 2005, we collected a specimen from Nêdong county of southern Xizang Zizhiqu (Tibet), China. We compared the morphological features among the existing four species and ultimately decided that a new species of *Orinus* should be recognized. The new species differs from all other known species of *Orinus* by having glumes that are longer than or subequal to the adjacent florets.

***Orinus longiglumis*** L.B. Cai & X. Su, *sp. nova* (Figs. 1 and 2)

*Species O. thoroldio valde similis, sed culmis cum foliis ubique pilifris (nec partim pilifris),*



**Fig. 2.** Inflorescences of *Orinus longiglumis*, showing the branch and flower arrangement of the panicles.

*panicula 8–23 cm longa (nec vulgo 4–8 cm longa), glumis sparsim spinulosis et pilosis, flosculis contiguus longioribus vel subaequantibus (nec glabris et flosculis contiguus conspicue brevioribus), paleis lemmatibus evidenter brevioribus (nec lemmatibus aequantibus vel leviter brevioribus), antheris 3.0–3.5 mm longis (nec 2.4–3.0 mm longis) bene differt.*

**HOLOTYPE:** China. Xizang Zizhiqu (Tibet), Nêdong county, Jieba, 29°15'N, 91°43'E, on sandy wasteland, alt. 3500 m, 28.VII.2005 L.B. Cai & C.R. Luosang 002 (holotype and isotype HNWP).

Perennial, loosely caespitose herbs. Rhizomes 6–20 cm long, 2.0–3.0 mm diam. at the base, cylindrical, multinodal, with many scales. Culms 20–50 cm tall, 1.5–2.5 mm diam., erect, pilose, with 6 to 8 nodes. Leaf sheaths densely villous, longer than the internodes; ligules ca. 1 mm long, membranous, lacinate near the apex; blades 7–12 cm long, 2.5–4.0 mm wide, flat or slightly involute at the margins, upper and lower surfaces densely villous. Panicles 8–23 cm

long, with 4–6 slightly spreading branches, the branches 1–9 cm long, one per node, sparsely pilose. Spikelets 7.0–9.0 mm long, 3- or 4-flowered, usually purplish; rachilla internodes ca. 1 mm long, glabrous; glumes longer than or subequal to the adjacent florets, lanceolate, acuminate, membranous along the margins, keeled on the back, sparsely spinulose and pilose along or near the keels and veins; lower glumes 6.0–7.0 mm long, 1-nerved; upper glumes 7.0–8.5 mm long, 3-nerved; lower lemmas 6.0–7.0 mm long, 3-nerved, lanceolate, densely villous, slightly keeled on the back, apex tridentate or tapering into a short mucro; paleas shorter than the lemmas by about 1 mm, pilose along the keels, apex bidentate. Anthers 3.0–3.5 mm long, yellow. Caryopses 2.5–3.0 mm long, narrowly oblong, yellowish-brown.

ADDITIONAL SPECIMENS EXAMINED (paratypes). — **China.** Xizang Zizhiqu (Tibet): Nêdong county, Zêtang, 10.VIII.1977 P.C. Kuo & W.Y. Wang 22297 (HNWP); *loco dicto*, 15.VII.1975 C.Y. Wu *et al.* 75–762 (HNWP, KUN); Jagcha county, 29.VII.1985 C.T. Ni & B.D. Thaxi. 362 (XZ); Nang county, Xiaobailu, 29°6'N, 91°12'E, on sandy beach, alt. 3050 m, 17.VIII.1972 *Xizang Medic. Pl. Exped. 4415* (HNWP, PE); Jagge, 21.VII.1978 *Suol. Sangjie 0207* (XZDC).

*Orinus longiglumis* is a perennial species from sandy soils. It occurs only in the river valleys, river banks and sandy wastelands in the Yarlung Zangbo Jiang valley (a section between Zêtang of Nêdong county and Jagge of Nang county), at 3040–3650 m. It flowers from July to August and has mature caryopses in September.

*Orinus longiglumis* is very similar to *O. thoroldii*, but differs by having longer panicles, longer glumes, longer anthers, and by the paleas that are shorter than the lemmas. This new species differs from all other known species of *Orinus* by having glumes that are longer than or subequal to the adjacent florets.

*Orinus longiglumis* is endemic to the south-central part of Xizang Zizhiqu (Tibet), China and is known only from a few localities in Nêdong, Jagcha and Nang Xian regions. *Orinus thoroldii* has a wide distribution, occurring throughout the Qinghai-Xizang Plateau (Cai 2004) and additionally in Kashmir area that is contiguous to the plateau (Bor 1960).

*Orinus longiglumis* also resembles *O. tibeticus* (Zhao & Li 1994) in having densely villous lemmas and thick rhizomes. However, *O. tibeticus* has shorter panicles, longer spikelets with 5–8 florets, shorter glumes, shorter lemmas, shorter anthers, and has paleas that are equal to or slightly shorter than the lemmas.

A summary of the differences among the five species of *Orinus* is given in Table 1, and the following key can be used to distinguish the species.

### Key to the species of *Orinus*

1. Panicles branches spreading; lemmas usually villous, lower lemmas 5.0–7.0 mm long ..... 2
1. Panicles with appressed branches; lemmas sparsely pilose or pubescent, lower lemmas 4.0–5.5 mm long .. 4
2. Glumes longer than or subequal to the adjacent florets; panicles 8–23 cm long ..... *O. longiglumis*
2. Glumes shorter than the adjacent florets; panicles generally 3–9 cm long ..... 3
3. Spikelets 6.0–8.5 mm long, usually 2–4-flowered; culms and leaves hairy on some parts ..... *O. thoroldii*
3. Spikelets 8.0–11.0 mm long, usually 5–8-flowered; culms and leaves hairy throughout ..... *O. tibeticus*
4. Spikelets 6.5–8.5 mm long, usually 2–4-flowered; lemmas sparsely pilose ..... *O. kokonorica*
4. Spikelets 5.0–6.0 mm long, only 1- or 2-flowered; lemmas sparsely pubescent ..... *O. anomala*

### Acknowledgements

The authors wish to thank Mr. Song Wen-Zhu for preparing the excellent illustration, Ma Bi-Hua and Luosang Ci-Ren for assistance with fieldwork, and Chen Chun-Fang for collecting the type. This work was funded by the Knowledge Innovation Program of Northwest Plateau Institute of Biology, the Chinese Academy of Sciences (Grant No. CXZY–2003).

### References

- Bor, N. L. 1960: *The grasses of Burma, Ceylon, India and Pakistan*. — Pergamon Press, Oxford.
- Cai, L. B. 2004: Two new recorded species of *Orinus* from Qinghai province. — *Bull. Bot. Res. (Harbin)* 24: 394–395. [In Chinese with English summary].
- Chen, S. L. & Phillips, S. M. 2006: *Orinus*. — In: Wu, Z. Y., Raven, P. H. & Hong D. Y. (eds.), *Flora of China*, 22. *Poaceae*: 464–465. Sci. Press, Beijing & Missouri Bot. Garden Press, St. Louis.
- Hitchcock, A. S. 1933: New grasses from Kashmir. — *J. Wash. Acad. Sci.* 23: 134–136.

Table 1. Morphological differences among the five *Oriinus* species.

Character	<i>O. anomala</i>	<i>O. kokonorica</i>	<i>O. longiglumis</i>	<i>O. thoroldii</i>	<i>O. tibeticus</i>
Plant	15–50 cm tall, culms and leaves pubescent at some parts	20–50 cm tall, only leaves spinulose at some parts	20–50 cm tall, culms and leaves villous or pilose at all parts	12–50 cm tall, culms and leaves villous or pilose at some parts	15–35 cm tall, culms and leaves villous or pilose at all parts
Rhizome	usually 1.5–8.0 cm long, 1.0–2.0 mm diam. at the base	usually 3–10 cm long, 1.0–2.0 mm diam. at the base	usually 6–20 cm long, 2.0–3.0 mm diam. at the base	usually 5–15 cm long, 1.0–3.0 mm diam. at the base	usually 4–13 cm long, 1.5–3.0 mm diam. at the base
Panicle	3–10 cm long, branches appressed	5–19 cm long, branches appressed	8–23 cm long, branches spreading	usually 4–9 cm long, branches spreading	3–9 cm long, branches spreading
Spikelet	stramineous or whitish, 5.0–6.0 mm long, only 1- or 2-flowered	greenish or stramineous, 6.5–8.5 mm long, usually 2- to 4-flowered	usually purplish, 7.0–9.0 mm long, generally 3- or 4-flowered	dark brown or purplish brown, 6.0–8.5 mm long, usually 2- to 4-flowered	dark brown or purplish brown, 8.0–11.0 mm long, usually 5- to 8-flowered
Glume	glabrous, the lower glumes 3.0–4.0 mm long and upper glumes 4.0–4.5 mm long, shorter than the adjacent florets	glabrous, the lower glumes 3.5–5.0 mm long and upper glumes 4.0–6.0 mm long, shorter than the adjacent florets	sparsely spinulose and pilose, the lower glumes 6.0–7.0 mm long and upper glumes 7.0–8.5 mm long, longer than or subequal to the adjacent florets	glabrous, the lower glumes 4.5–6.0 mm long and upper glumes 5.0–7.0 mm long, markedly shorter than the adjacent florets	glabrous or sparsely pilose, the lower glumes 4.5–5.5 mm long and upper glumes 5.0–6.0 mm long, markedly shorter than the adjacent florets
Lemma	sparsely pubescent, the lower lemmas 4.0–5.0 mm long	sparsely pilose, the lower lemmas 4.5–5.5 mm long	densely villous, the lower lemmas 6.0–7.0 mm long	densely or sparsely villous, the lower lemmas 5.0–6.5 mm long	densely villous, the lower lemmas 5.0–6.0 mm long
Palea	equal to or slightly shorter than the lemmas	subequal to the lemmas	markedly shorter than the lemmas	slightly shorter than the lemmas	equal to or slightly shorter than the lemmas
Anther	orange, 1.5–2.1 mm long	yellowish, 1.6–2.6 mm long	yellow, 3.0–3.5 mm long	yellow or purple yellow, 2.0–3.0 mm long	yellow, 2.7–3.0 mm long
Caryopsis	1.8–2.5 mm long	2.6–3.0 mm long	2.5–3.0 mm long	2.4–3.0 mm long	2.4–2.9 mm long

- Keng, Y. L. 1959: *Orinus*. — In: Keng, Y. L. (ed.), *Flora Illustralis Plantarum Primarum Sinicarum Gramineae*: 283–286. Sci. Press, Beijing. [In Chinese].
- Liou, L. 1987: *Orinus*. — In: Wu, C. Y. (ed.), *Flora Xizangica*, 5: 71–72. Sci. Press, Beijing. [In Chinese].
- Lu, S. L. 1999: *Orinus*. — In: Liu, S. W. (ed.), *Flora Qinghaiica*, 4: 172–173. Qinghai People's Publ. House, Xining. [In Chinese].
- Yang, X. L. 1990: *Orinus*. — In: Chen, S. L. (ed.), *Flora Reipublicae Popularis Sinicae*, 10(1): 39–41. Sci. Press, Beijing. [In Chinese].
- Zhao, N. X. & Li, M. F. 1994: New taxa and new recording species of Gramineae from Tibet. — *Acta Bot. Yunnanica* 16: 228–230. [In Chinese with English summary].