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Morphological Study of Wild Grasses Belonging to Tribe Maydeae from Washim District, Maharashtra

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Abstract:
Washim District lies in the Vidarbha region of Maharashtra and comprises six talukas, namely Washim, Malegaon, Risod, Manora, Mangrulpir and Karanja. Deore (2010) had earlier recorded 63 grass species in 25 genera from the district, of which two belong to the tribe Maydeae of the family Poaceae. The present study, carried out during 2022–2024, aimed to describe the morphological characters of these two wild grasses and to confirm their identification as *Chionachne koenigii* (Spreng.) Thwaites and *Coix aquatica* Roxb. Field surveys were conducted at various places in the district, and the vegetative and reproductive characters of the plants were recorded. The characters studied were habit, culm, nodes, leaf sheath, ligule, leaf blade, inflorescence, spikelets and glumes. Photographs of the spikelets were taken to show the important characters, and the small reproductive parts were examined under a stereoscopic binocular microscope. In both species, male and female spikelets are borne on different parts of the same inflorescence. The two species can be separated by the structure that encloses the female spikelet: in *Coix aquatica*, the fruit case is closed and formed from the leaf sheath, whereas in *Chionachne koenigii*, it is longitudinally open and not formed from the leaf sheath. A dichotomous key and detailed morphological descriptions are given to aid identification.

Keywords: Maydeae, Poaceae, *Chionachne koenigii*, *Coix aquatica*, wild grasses, morphology, identification, Washim District, Maharashtra.

1. Introduction

Grasses are important monocotyledonous plants of the family Poaceae. They occur in many habitats, such as grasslands, agricultural fields, wastelands and open areas. Their plant parts and flowers vary considerably, and these morphological characters help in identifying the different species.

Grasses are identified by examining characters such as culm, nodes, leaf sheath, ligule and leaf blade. The structure of the inflorescence, spikelets and glumes is also important in distinguishing one grass species from another.

The tribe Maydeae belongs to the subfamily Panicoideae of the family Poaceae. In this tribe, the male and female spikelets are separate and may be borne on different parts of the same inflorescence or on different inflorescences. Maize (*Zea mays* L.), an important cereal crop, is a member of this tribe, as are the genera

Coix and *Chionachne*. The arrangement and structure of their spikelets are useful in identifying these grasses (Potdar et al., 2012).

The present study deals with two wild grasses of the tribe Maydeae from Washim District, Maharashtra, namely *Chionachne koenigii* (Spreng.) Thwaites and *Coix aquatica* Roxb. Their vegetative and reproductive characters were studied, with special attention to the arrangement of the male and female spikelets and to the structures enclosing the female spikelets. The main objective was to describe the important morphological characters of these two species.

2. Review of Literature

In Maharashtra, Patunkar (1980) studied the grasses of the Marathwada region and published his work as *Grasses of Marathwada*. Potdar et al. (2012) published *Grasses of Maharashtra*, based on the exploration and detailed study of the grass diversity of the state, which describes 415 species in 125 genera. Sharma et al. (1996) compiled the monocot flora of the state, while Yadav and Sardesai (2002) described the flora of Kolhapur District.

Floristic accounts of districts in Vidarbha and neighbouring areas include those of Akola (Kamble and Pradhan, 1988), Chandrapur and Gadchiroli (Patil, 1991), Yavatmal (Karthikeyan and Kumar, 1993), Buldhana (Diwakar and Sharma, 2000) and Amravati (Dhore, 1986). Grass studies include those of Amravati District (Masatkar, 2018) and the Nagpur Division (Tathod, 2019). For Washim District, floristic accounts were provided by Deore (2010) and Deore and Bhogaonkar (2023). The present study provides a focused morphological account of the Maydeae grasses of the district.

3. Study Area

Washim District is located in the Vidarbha region of Maharashtra, India. It is surrounded by Akola District in the north, Amravati in the north-east, Yavatmal in the east, Hingoli in the south and Buldhana in the west. The district has six talukas: Washim, Malegaon, Risod, Manora, Mangrulpir and Karanja.

Field surveys were conducted at various places in Washim District. The plants were studied in their natural habitats, including stream and river banks, pond margins and wet areas, and specimens were collected from selected habitats during these surveys.

4. Materials and Methods

4.1 Sample Collection and Preservation

Grass specimens were collected from selected habitats during field visits. Field observations and important plant characters were noted in a field diary. The collected specimens were examined carefully and then pressed and dried for preservation.

4.2 Herbarium Preparation

The collected specimens were pressed between sheets of newspaper and dried thoroughly. The dried specimens were then mounted on herbarium sheets and labelled with the relevant collection details. The prepared herbarium specimens were kept for future reference and study.

4.3 Morphological Observations

The morphological characters of the collected specimens were studied in detail. Habit, culm, nodes, leaf sheath, ligule and leaf blade were observed and recorded. The reproductive characters, namely inflorescence, spikelets, glumes, lemmas, paleas, lodicules, stamens, ovary and grain, were examined carefully under a stereoscopic binocular microscope. Measurements were recorded in millimetres or

centimetres, as appropriate. Close-up photographs of the spikelets were taken to document the important morphological characters.

4.4 Identification

The collected specimens were identified with the help of standard floras and taxonomic literature, including *Flora of British India* by Hooker, *Flora of the Presidency of Bombay* by Cooke, *Grasses of Maharashtra* by Potdar et al. and *Grasses of Marathwada* by Patunkar. The observed morphological characters were compared with the descriptions and identification keys given in these works to establish the identity of the specimens.

5. Key to the Genera of Tribe Maydeae

1a. Fruit case closed, formed by leaf sheath — *Coix*

1b. Fruit case longitudinally open, not formed by leaf sheath — *Chionachne*

6. Taxonomic Description

Chionachne R.Br.

Chionachne koenigii (Spreng.) Thw., *Enum. Pl. Zeyl.* 357, 1864; Kamble and Pradhan, *Fl. Ak.* 259, 1988; Naik, *Fl. Mar.* 2: 999, 1998; Sharma et al., *Fl. MS. Monocot*: 422, 1996; Deore and Bhogaonkar, *Floristic Survey of Washim District*, p. 399, 2023.

Vernacular name: Kanta-karval.

Perennial herbs. Culms tufted, terete, erect, 60–120 cm tall, sometimes very stout; nodes densely bearded. Leaves: sheaths compressed, the upper ones boat-shaped, 3.3–6.1 cm long, glabrous or hispid, with ciliate margins that are densely ciliate towards the apices; ligule membranous; blades flat, linear-lanceolate, 7–40 × 0.6–1.8 cm, hispid, with scabrid margins and an acute to acuminate apex. Racemes monoecious, 2–3 cm long, spathaceous, with a solitary female spikelet at the base and the terminal spikelets male; spathes glabrous or hairy. Male spikelets obovate, 8–11 mm long. Lower glume herbaceous, elliptic-lanceolate, 8–11 × 1–2.5 mm, 9–11-nerved, with 2 winged keels, inflexed margins and a muticous apex. Upper glume membranous, 7.5–8.5 × 1–1.5 mm, 2-keeled, with broadly inflexed margins and an acute apex. Lower lemma hyaline, linear-lanceolate, 7.5–8.5 × 1–1.5 mm, 1-nerved, muticous at apex. Palea hyaline, equal, oblong to obovate-lanceolate, 7–8 × 0.6–1 mm, acute at apex. Lodicules 2, cuneate. Stamens 3, with yellow anthers 6–6.6 mm long. Upper lemma narrowly oblong-lanceolate, 1-nerved, muticous. Palea equal, nerveless. Floret similar to the lower one.

Female spikelet sessile, 3.5–5.5 mm long. Lower glume oblong, 3.5–4.5 mm long, obscurely nerved, obtuse or apiculate at apex. Upper glume membranous, ovate to oblong-lanceolate, equal to the lower, with ciliate margin. Lower lemma empty, hyaline, oblong-lanceolate, 3–3.2 mm long, 3-nerved, with inflexed margins, epaleate. Upper lemma narrowly oblong, shorter than the lower, 1-nerved, truncate at apex. Palea narrowly linear-lanceolate, as long as the lemma, nerveless. Lodicules 2. Grain 3.5–4.5 mm long, enclosed within the hardened lower glume.

Flowering and fruiting: September to January.

Occurrence: Common, along streams and river banks and margins of ponds and on the bunds of fields.

Locality: Girda.

Coix L.

Coix aquatica Roxb., *Fl. Ind.* (ed. 1832) 3: 571, 1832; Hook. f., *FBI* 7: 170, 1896; Cooke, *Fl. Pres. Bom.* 3: 495, 1958 (Repr.); Sharma et al., *Fl. MS. Monocot*: 390, 1996; Deore and Bhogaonkar, *Floristic Survey of Washim District*, p. 401, 2023.

Vernacular name: Kasai.

Annual or perennial herbs. Culms terete, erect, 1–2 m tall; nodes glabrous. Leaves: sheaths compressed, 3.9–6 cm long, glabrous; ligule membranous, 1 mm long; blades flat, linear-lanceolate, 7–40 × 0.7–2 cm, cordate at base, with conspicuous glands bearing bristle-like hairs on the upper surface, ciliate margins and an acuminate apex. Peduncles of the racemes 3–6 cm long, glabrous. Inflorescence: racemes spiciform, with the female spikelet at the base enclosed in a hard, rounded bract and the male spikelets borne above it. Male spikelets 2–3-nate, lanceolate, 9–11 × 2.5–4 mm, muticous. Lower glume herbaceous, elliptic-lanceolate, 8–10 × 2.5–4 mm, concave, many-nerved, with 2 winged keels, inflexed margins and a 2-toothed apex. Upper glume herbaceous, narrowly elliptic, purple, 7–8 × 2.2–2.8 mm, 5-nerved. Lower lemma hyaline, oblong-lanceolate, equalling the upper glume, muticous. Lower palea hyaline, 4.8–5.1 mm long. Lodicules 2, cuneate. Stamens 3, with yellow anthers 6–6.2 mm long. Upper lemma hyaline, elliptic-lanceolate, 5.8–6 mm long, 3-nerved, muticous at apex. Palea hyaline, nerveless. Lodicules 2, cuneate. Stamens 3, with anthers 5.9–6.1 mm long or sometimes smaller. Female spikelets ovoid, 10–11 × 5–6 mm, greenish-white, acuminate, completely enclosed in the modified leaf sheath, which forms a bony involucre. Lower glume chartaceous, oblong-lanceolate, 8–9 mm long, dorsally flat, faintly nerved, with inrolled margins and an apex that is acuminate or bears a 2.4–3.1 mm long beak. Upper glume hyaline, narrowly oblong, subequal, keeled, with 2 deep grooves along the margins; apex acuminate. Lower lemma empty, oblong-lanceolate, 7.4–8.5 mm long, 5-nerved, acuminate at apex. Upper lemma similar, faintly nerved. Palea similar, hardly keeled. Staminodes sometimes present. Ovary ellipsoid.

Flowering and fruiting: September to January.

Occurrence: Occasional, along stream and river banks and along margins of ponds.

Locality: Dhamni.

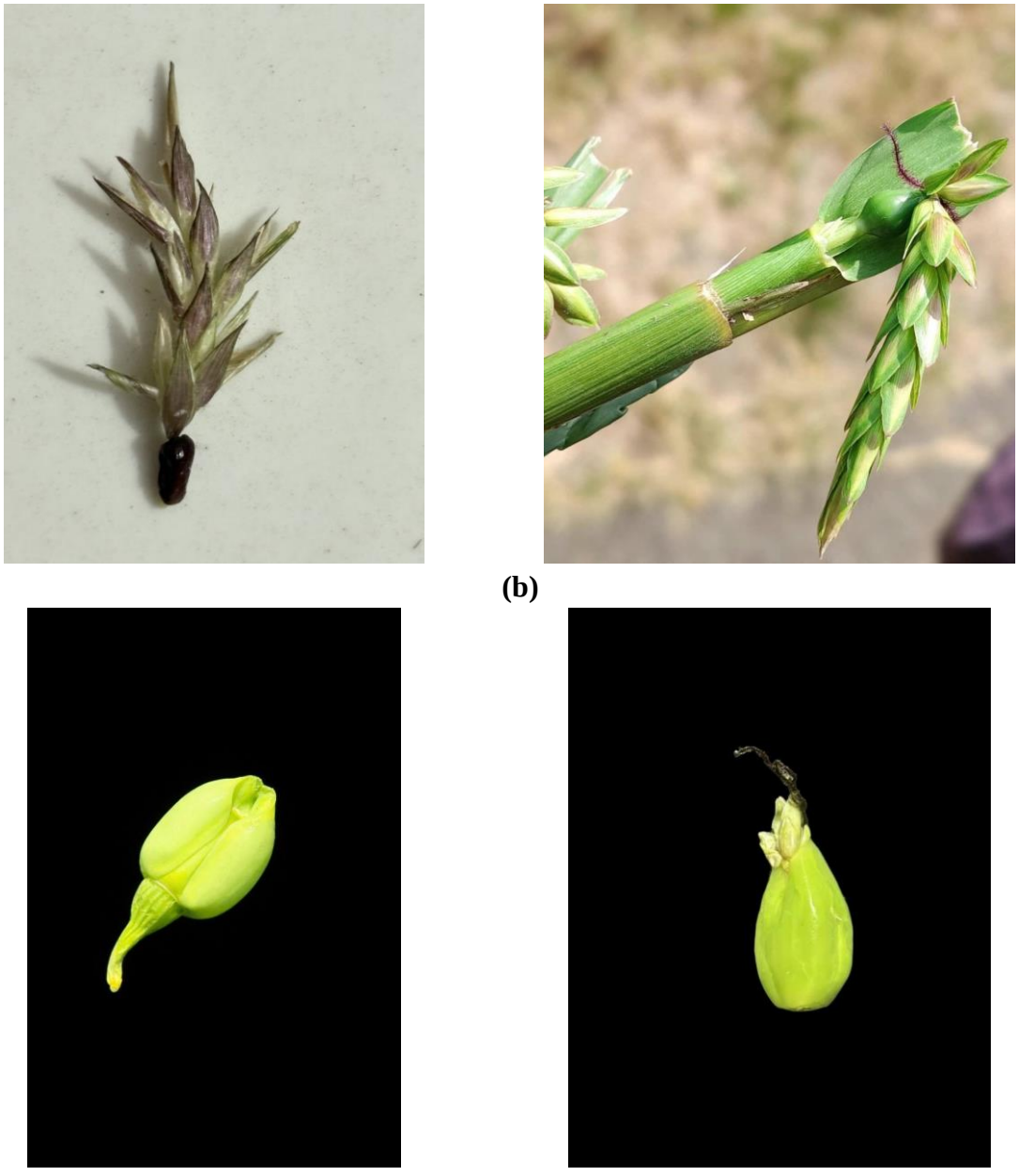

Fig. 1. Arrangement of male and female spikelets in (a) *Chionachne koenigii* and (b) *Coix aquatica*, and stereoscopic binocular microscope images of female spikelets in (c) *Chionachne koenigii* and (d) *Coix aquatica*.

7. Conclusion

The present study describes the morphological characters of *Chionachne koenigii* and *Coix aquatica*, two wild grasses belonging to the tribe Maydeae in Washim District, Maharashtra. The study shows that the two species can be distinguished by their vegetative and reproductive characters, particularly the structure enclosing the female spikelet. In *Coix aquatica*, the female spikelet is completely enclosed within a modified leaf sheath forming a hard involucre, whereas in *Chionachne koenigii*, the female spikelet is associated with a longitudinally open structure. The identification key, detailed morphological descriptions and spikelet photographs presented in this study will help in the identification of these species and support further taxonomic studies of the tribe Maydeae in Washim District.

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