Preliminary Observations on the Ethnobotany of the Genus *Coix*

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The genus *Coix* belongs to the tribe Maydeae (Tripsaceae) of the family Poaceae. The tribe consists of annual or perennial monoecious grasses with the staminate spikelets in 2's or 3's, the carpellate single or in 2's or 3's, both kinds in the same or in different inflorescences. In *Coix* the carpellate spikelets are in 3's (1 fertile, 2 sterile), each group being enclosed in a more or less hardened, bead-like structure, the involucre, formed from the metamorphosed leaf sheath. The axis of the staminate portion of the inflorescence protrudes from the orifice at the apex of the involucre.

Instances are on record in *Coix aquatica* Roxb. where, abnormally, more or less perfect leaf blades develop at the tip of the involucres (4, 5). We have examined, at Calcutta, the specimen cited by Haines (5)(*Watt*, from Balasore, Orissa); several involucres have leaf blades on their tips (Fig. 1). This confirms that the involucre is a metamorphosed leaf sheath.

Recently, while studying material of *Coix* and allied genera, we gathered data on this genus during field work and from herbarium sheets, and also from obscure literature. These are of much ethnobotanical interest and are brought together here.

References to *Coix* are found in European literature of the 17th and 18th centuries, such as the work of Rumphius (11). *Coix lacryma-jobi* is referred to in such early works as "Griemile," "Lithospermon," "Aegonychon," "Diospyron," "Heracleos." The edibility of the seeds was recorded as early as 1731 (8). In Asia, the plant reportedly was known in Vedic times; the Arabs called it "Damu Daud" (David's tears) and later "Damu Ayub" (Job's tears), referring to the shape of the involucre. Its medicinal value, as a tonic and diuretic, is said to have been known as early as 1260 A.D. Sometime after this, the plant was introduced by the Arabs into the West (13).

The genus *Coix* is represented in India by four species: *C. aquatica*, *C. gigantea*, *C. lacryma-jobi*, and *C. puellarum*.

1. *Coix aquatica* Roxb.

This grass is a weed in ponds and lakes of India and is sometimes grown for fodder. The involucres usually are ovate and are constricted at the neck into a beak (Fig. 2). A specimen collected by Wallich (Wall. Cat. No. 8625; Kiev Herbarium) from a marsh in South India shows more or less elliptic involucres (Fig. 3). Another variation in the shape of the involucre is a marked constriction in its middle (Fig. 8).

A recent collection from Maubhang (Orissa) indicates that the involucres are eaten by the villagers.

2. *Coix gigantea* Koenig ex Roxb.

Bengali — "Danga gurgur"; Madhya Pradesh, Nagpur — "Chirudali."

This grass is very similar to *C. aquatica* and is often difficult to distinguish from

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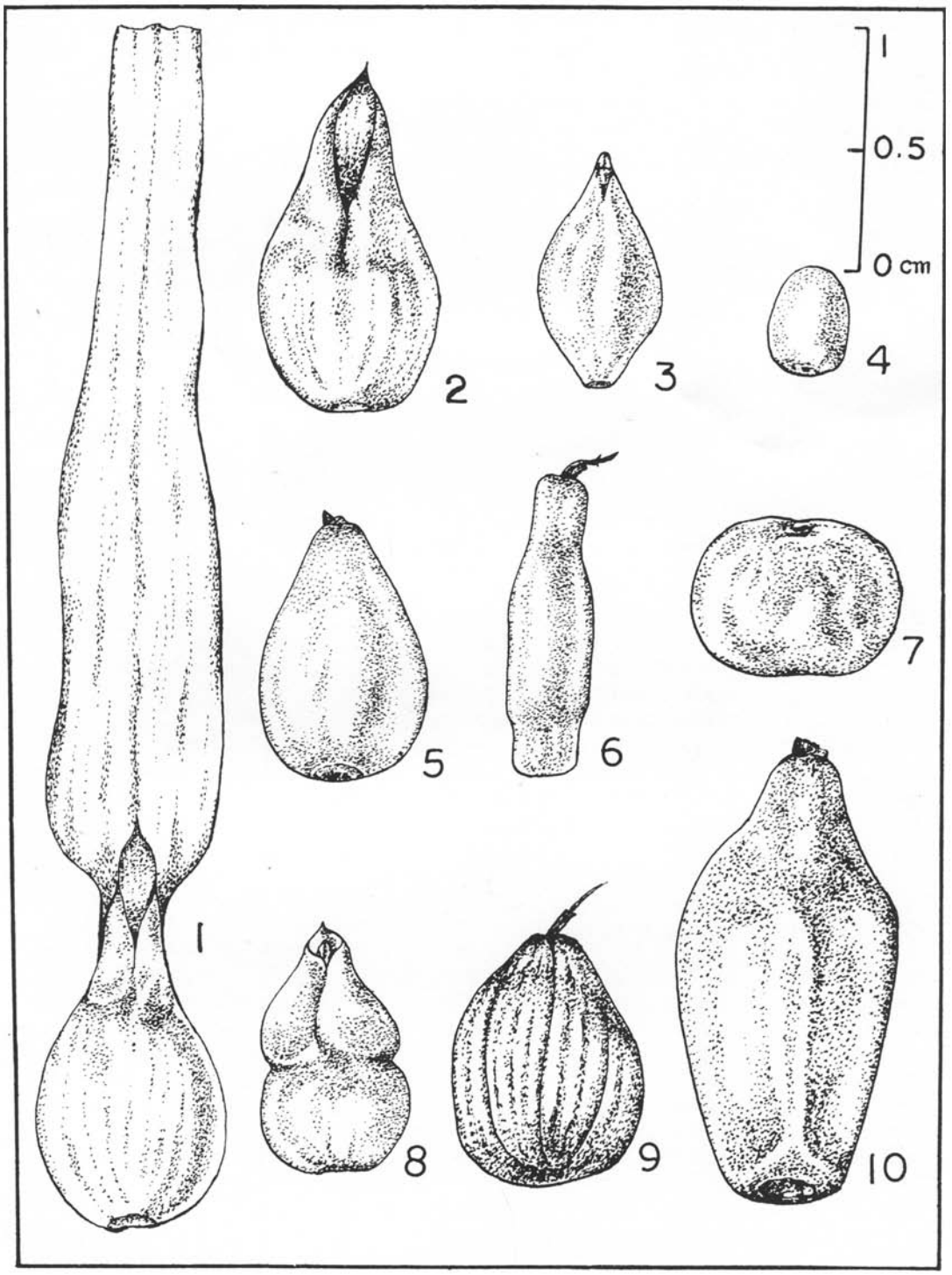

Fig. 1. *Coix* involucres. 1, 2, 3, 8, *C. aquatica.* 4, *C. puellarum.* 5, *C. lacryma-jobi* var. *lacryma-jobi.* 6, *C. lacryma-jobi* var. *stenocarpa.* 7, *C. lacryma-jobi* var. *monilifer.* 9, *C. lacryma-jobi* var. *ma-yuen.* 10, *C. gigantea.*

it. But certain characters, chiefly habitat, enable identification. This grass occurs as a weed. The involucres are usually 8-12 mm long. One specimen collected in North East Frontier Agency (*Rolla Rao* 1662) has involucres up to 18 mm long (Fig. 10) and slightly triangular in cross section.

The involucres of *C. gigantea* are reported as useful for making some ornaments or for decorating fancy containers. The grains, taken out of the involucres, can be fed to poultry (1).

3. *Coix lacryma-jobi* L.

Bengali — "Gurgur"; Hindi — "Gurlu, Sankru"; Marathi — "Ranmakkai"; Punjabi — "Sanklee"; Sanskrit — "Gavedhu, Jargadi"; Tamil — "Netpavalum."

This is the most widespread and well-known species of the genus. The four varieties found in India are easily distinguished by shape and size of involucres.

Key to the Varieties of *Coix lacryma-jobi*

Involucres ovoid (Figs. 5, 9)
- Involucres hard, not striate (Fig. 5) — 3a. *lacryma-jobi*
- Involucres soft, striate (Fig. 9) — 3b. *ma-yuen*

Involucres not ovoid but globose, flattened, or cylindrical (Figs. 6, 7)
- Involucres globose or broader than long, 7-10 mm in diameter (Fig. 7) — 3c. *monilifer*
- Involucres much longer than broad, cylindrical or bottle-shaped (Fig. 6) — 3d. *stenocarpa*

3a. *Coix lacryma-jobi* L. var. *lacryma-jobi.*

This is the commonest variety. The ovoid, hard, and usually shining involucres vary from 6-8 mm wide and 8-12 mm long (Fig. 5). Several cultivated races varying in hardness and colour of involucres are found.

The chief uses of this variety are the following.

Food. This variety, though largely collected wild, is also cultivated for its edible fruits. They can be used for baking, mixed with wheat flour, and for making porridge and beer (4). The senior author observed, among the tribals of Madhya Pradesh, that in South Bastar the grain is called "Kasa" and is eaten (6).

Ornaments and Decoration. The most common use of this variety is for making ornaments, particularly necklaces. The involucres, which sometimes show variation in colour, make very beautiful, cheap ornaments commonly employed among the poor and the tribal people. Forest dwellers often bring these "beads" from the forests and sell them in tribal and village markets. This forest product thus contributes to the local economy of the forest villages. Panigrahi & Joseph (9) reported the use of the "beads" for ornamental purposes in Tirap Frontier Division of North East Frontier Agency in eastern India. The use of the "beads" for ornaments is not so well known among the Gonds of Bastar in Madhya Pradesh. They use the involucres as cereal but do not report its use in ornaments. The Baigas of Balaghat (Madhya Pradesh), however, do use the "beads" for ornament. They call the grass "Gurud" or "Garu."

Medicine. The United States Dispensatory (12) reports the use of these "beads" in medicine for catarrhal affection and in urinary complaints. A specimen from Manbhum, Bihar, bears a note on the use of the roots of this plant in strangury and the menstrual complaints known as "Stika." Notes on some herbarium sheets in the Coimbatore and Dehra Dun herbaria indicated that the fruits had blood-purifying, tonic, and diuretic properties (2).

Some interesting medicinal uses of this grass have been reported from among the Santals of Bihar and Bengal (3, 7). Some of these are as follows.

The roots of this grass, mixed with roots of *Jussiaea suffruticosa* L., *Piper longum* L., and *Clerodendrum indicum* (L.) O. Ktze. are ground and given in

fever. In another prescription for the same disease, the roots of *Piper* and *Clerodendrum* are replaced with roots of *Woodfordia fruitcosa* (L.) Kurz. If, in the first prescription, *Clerodendrum* is replaced by a few pieces of garlic (*Allium sativum* L.), this medicine is good for thirst.

The roots are ground with roots of a plant locally called "Latha cip cirip rehet" (*Achyranthes aspera* L.). This medicine is prescribed for checking the spread of smallpox. It is not administered to the patient, but a ritual is associated with it. An unmarried girl spins a thread of cotton. The medicine is tied in this thread and the thread is tied on the patient. Some Mantras (oracles) are recited. This will keep the smallpox confined to this person.

The roots are mixed with: bark of *Elaeodendron roxburghii* Wt. & Arn., root of *Abrus precatorius* L., root of *Embelia tsjeriam-cottam* A. DC., white *Allium cepa* L., bark of *Casearia elliptica* Willd., *Allium sativum* L., bark of *Gmelina arborea* Roxb., leaves of *Ocimum sanctum* L., bark or root of *Emblica officinalis* Gaertn., tuber of *Piper longum* L., and the tuber of *Curcuma angustifolia* Roxb. These are ground together and boiled with refuse of molasses; the mixture is given for diarrhoea.

The roots are mixed with roots of *Dipteracanthus suffruticosa* Voigt, roots of *Bonnaya veronicaefolia* Spreng., and bark of *Clerodendrum indicum* (L.) O. Ktze. The mixture is ground and given in puerperal fever.

The grass is mixed with 12 other ingredients: *Lannea coromandelica* (Houtt.) Merr., *Pterocarpus marsupium* Roxb., bark of *Terminalia tomentosa* Wt. & Arn., bark of *Shorea robusta* Gaertn. f., *Areca catechu* L., *Cryptolepis buchanani* Roem. & Schult., *Agave americana* L., *Piper longum* L., the wild castor oil plant (*Ricinus communis* L.), *Argyreia nervosa* (Burm. f.) Boj., *Smilax ovalifolia* Roxb., and a porcupine's stomach. The parts of the plants are not specified in all cases. These are ground together and made into pills. Three pills a day can control dysentery.

The roots have also been used in veterinary medicine, mixed with bulbs of *Zingiber cassumunar* Roxb., bark of *Oroxylum indicum* Vent., tuber of a variety of *Colocasia esculenta* (L.) Schott., old tamarinds (*Tamarindus indicus* L.), and distilled seeds of *Semecarpus anacardium* L. f. These are ground together, mixed with stale rice water, and given to drink.

Fodder. The leaves and stems provide a useful fodder for cattle and buffaloes. The grass is very suitable for growing in swampy areas. Its average yield is 12 tons per acre (4). The grass can also be turned into ensilage (1).

3b. *Coix lacryma-jobi* L. var. *ma-yuen* (Romanet) Stapf.

The involucres in this variety are longitudinally striated (Fig.9). They range widely in size; their shape is almost spherical to pyriform. Some are so strong as to be hardly breakable between the fingers; others are quite soft. This grass occurs in Assam, North Bengal, and Orissa.

The involucres are used for making beverages. These can also be eaten whole like rice. Earlier notes mention that the fruits ground into "Atta" (flour) were not good for eating. This variety does not seem to possess good baking qualities. Rao & Joseph reported its cultivation in Siang Frontier Division, North East Frontier Agency for its edible fruits (10). The grass also provides fodder. The wild races have hard-shelled fruits and the cultivated ones have soft-shelled fruits. Breeding work with the soft-shelled races might create a useful cereal. Curiously, there is no mention on any of the specimens of this variety about the use of the hard "beads" available from the wild plants, for making ornaments. The striation on the fruits and variation in colour actually make these "beads" more beautiful and suitable for ornaments.

3c. *Coix lacryma-jobi* L. var. *monilifer* Stapf.

The involucres in this variety are broader than long, or almost globose (Fig. 7). This grass was believed to occur in Burma and further eastward only. However, a very early collection from Sikkim Himalaya in eastern India (*King* and *Proudlock*) is in the Calcutta herbarium. The few sheets of this variety available bear no remarks on use. The globose involucres are very pretty and should be good for ornament. The grass, however, is not very common and cannot provide adequate supplies for use on a commercial scale.

3d. *Coix lacryma-jobi* Linn. var. *stenocarpa* Stapf.

Naga Hills — "Sikra kracha," "Krada."

The involucres in this variety are cylindrical, narrow, much longer than broad, constricted above, and more or less bottle-shaped (Fig. 6) — very distinct from all other varieties. This grass occurs in eastern India.

The "beads" are largely used by the hill tribes for various types of ornaments. Accessories for dancing, such as the head-wear or "Crown," necklaces, and ornamental belts are often seen covered or studded with these "beads." This variety is common in Siang Frontier Division, North East Frontier Agency, and the Abors occasionally cultivate it for its "beads" (10). Vegetative parts are used for fodder.

4. *Coix puellarum* Balansa.

The involucres in this grass are the smallest among the Indian species. They are more or less globose and about 4 mm in diameter (Fig. 4). This grass occurs in eastern India, and extends to southeast Asia.

There is no mention of any use of this grass either on the herbarium sheet (Tripura, in Assam) examined by us, or in literature. But, the small involucres could make a useful contribution in patterns of ornamentation.

Miscellaneous. The dried leaves of all *Coix* may be used for thatching.

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