ON THE ORIGIN OF *ELEUSINE AFRICANA*

All but one of the known species of the genus *Eleusine* Gaertn. occur in Africa and seven are endemic to that continent (Phillips 1972). In India the genus is represented by only two species: *E. indica* (L.) Gaertn. and *E. coracana* (L.) Gaertn. [*E. compressa* (Forssk.) Christ. was excluded from the genus by Hilu (1981)].

Opinions on the taxonomic position of the taxon under discussion have varied considerably and consequently different names have been assigned to it: *Eleusine africana* K.-O'Byrne (1957), *E. indica* (L.) Gaertn. subsp. *africana* (K.-O'Byrne) S.M. Phillips (1972), and *E. coracana* (L.) Gaertn. subsp. *africana* (K.-O'Byrne) Hilu & De Wet (1976).

Moffet & Hurcombe (1949) were the first to report a tetraploid (2n=4x=36) form of *E. indica* from Africa (cf. Kennedy-O'Byrne 1957). On the basis of morphological characters, especially the length of the lemma, and the different chromosome numbers, Kennedy-O'Byrne (1957) separated this form from the typical diploid (2n=2x=18) *E. indica* and raised it to species rank. The first Indian record of the tetraploid form was from Assam-Shillong (Subramanyam & Kamble 1967). Hiremath (1973) studied a further Indian record of the tetraploid form, collected at Hattaragi, and found that the morphology, karyotype and meiosis fully agreed with the African collections of the tetraploid *E. africana*. More recently Sinha (1983) and Dixit *et al.* (1987) reported *E. africana* from Almora (Uttar Pradesh) and Hoshnabad and Betul region (Madhya Pradesh) respectively. Both Sinha (1983) and Dixit *et al.* (1987) believed the plant to be of Indian origin.

We collected *E. africana* from Hattaragi (Belgaum District, Karnataka State, India) situated on Pune-Bangalore National Highway No. 4 during September–October 1985 (Salimath 1990). It was growing as a weed in cultivated fields, open grasslands and disturbed areas. Mature plants and seeds were collected from naturally growing populations. From the seed collected, plants were raised to maturity in the experimental garden of the Department of Botany, Karnatak University, Dharwad.

The chromosome number was established by studying the meiosis following the method of Chennaveeraiah & Hiremath (1974). The specimens were identified by the Royal Botanic Gardens, Kew, U.K. The 2C nuclear DNA content was estimated in this, as well as a collection from Kenya, using a Vickers M86 Scanning Microdensitometer (Hiremath & Salimath in prep.). Seed morphology of the present Indian collection and a collection from Kenya were studied using a Scanning Electron Microscope. For SEM observation, dry seeds washed in acetone, mounted on double adhesive tape, were coated with gold in a Hitachi HVS-5 GN vacuum coater and finally observed under Hitachi S-450 Scanning Electron Microscope operated at 15 kV. A herbarium specimen has been deposited in the Herbarium, Royal Botanic Gardens, Kew, U.K. and a duplicate is also filed in the Herbarium, Department of Botany, Karnatak University, Dharwad.

The following features of the material were investigated: gross morphology (Figure 17A, B), chromosome number (2n=4x=36), normal meiotic behaviour showing 18 regular bivalents (Figure 17C), tuberculate spermoderm pattern (Figure 18A, B) and 5.11 pg of 2C nuclear DNA content. Material of *E. africana* from Kenya, subjected to the same investigation, gave exactly the same results.

There has been a long-standing debate regarding the origin and evolution of finger millet *E. coracana*. De Candolle (1886), Burkill (1935), Cobley (1956) and Dixit *et al.* (1987) considered it to be an Indian domesticate. Vavilov (1951) proposed an independent origin of finger millet in Africa and India. On the other hand, Mehra (1963), Porteres (1970), Chennaveeraiah & Hiremath (1974) and Hilu & De Wet (1976) considered this crop to be African in origin. Cytogenetic, morphological, phyto-

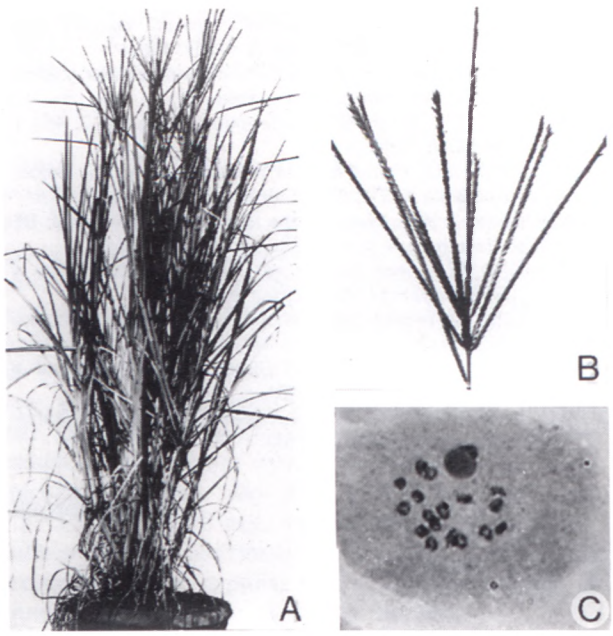

FIGURE 17.—A, potted plant of *E. africana* K.-O'Byrne from Hattaragi, India; B, spike enlarged; C, diakinesis showing 18 bivalents.

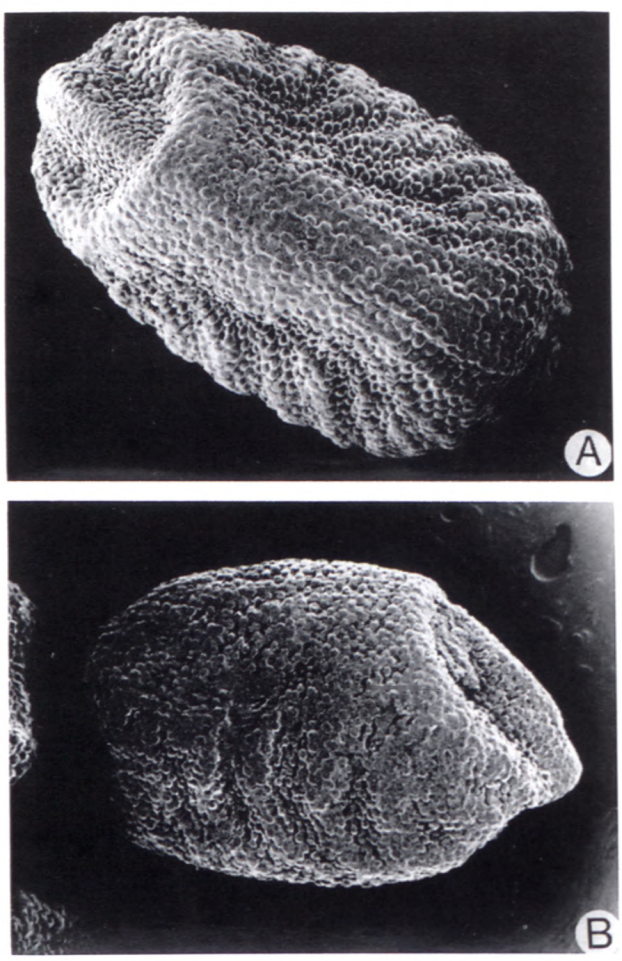

FIGURE 18.—A, tuberculate spermoderm pattern in *E. africana* K.-O'Byrne from Kenya, × 30; B, tuberculate spermoderm pattern in *E. africana* K.-O'Byrne from Hattaragi, India, × 30.

geographical, historical and archaeological studies strongly suggest that *E. africana* is the wild progenitor of *E. coracana* which was domesticated in the highlands of East Africa (Chennaveeraiah & Hiremath 1974; Hilu & De Wet 1976; Hilu *et al.* 1979). Introduction of the crop species, finger millet, from Africa to India is believed to have taken place as early as 3000 B.C. (Hilu & De Wet 1976). Therefore, regarding the occurrence of *E. africana* in India, it appears that it was introduced as a contaminant of imported seed of finger millet. On the other hand, considering the direct origin of finger millet from *E. africana* (Chennaveeraiah & Hiremath 1974), it is possible that in India it might have originated as a reversion from an escaped finger millet. Such evidence is available in the case of *Sorghum bicolor* (L.) Moench. subsp. *arundinaceum* (Desv.) De Wet & Harlan, which arrived in India from Africa by reversion of *S. bicolor* subsp. *bicolor* (Thomas A. Cope, pers. comm.).

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