Short Communication

Old and new nomenclatural combinations for *Echinochloa esculenta* (Japanese millet) and *E. frumentacea* (Indian millet) (Poaceae)

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Abstract - *Echinochloa esculenta* and *E. frumentacea* are crops derived from the wild *E. crus-galli* and *E. colona* respectively. They are currently treated at the species rank, although different infraspecific ranks have been proposed for both taxa in the past. After some considerations on domestication of Japanese and Indian millets, we propose to follow the concept by Harlan and De Wet, which implies the subspecific rank for the domesticated plants. Accordingly, the existing combination for *Echinochloa esculenta* is recovered and a new combination for *E. frumentacea* is here established.

Key words: domestication, *Echinochloa*, nomenclature.

Riassunto - Vecchie e nuove combinazioni nomenclaturali per il miglio giapponese (*Echinochloa esculenta*) e il miglio indiano (*Echinochloa frumentacea*) (Poaceae).

Echinochloa esculenta ed *E. frumentacea* sono colture derivate rispettivamente dai selvatici *E. crus-galli* ed *E. colona*. Correntemente sono trattate al rango di specie benché nel passato siano state proposte per entrambe differenti ranghi infraspecifici. Dopo alcune considerazioni sulla domesticazione e sui rapporti di discendenza dei taxa in oggetto, gli autori suggeriscono di allineare la posizione tassonomica dei medesimi al modello di Harlan e De Wet per le piante coltivate, che prevede il rango di sottospecie per le piante domesticate. A tal fine, propongono una nuova combinazione per *E. frumentacea*.

Parole chiave: domesticazione, *Echinochloa*, nomenclatura.

Within the genus *Echinochloa* P.Beauv. the human domestication obtained two cereals: Japanese millet (*E. esculenta* (A.Braun) H.Scholz) and Indian millet (*E. frumentacea* Link). Both of them are subject to agricultural experimentation in Italy, with little chance of escape (Galasso *et al.*, 2018). Phylogenetic investigations on these crops allowed to focus and confirm the identity of their wild ancestors (Yabuno, 1966; Hilu, 1994; Yamaguchi *et al.*, 2005; Sebastin *et al.*, 2019). *Echinochloa frumentacea* is the domestication result of *E. colona* (L.) Link, begun in Africa perhaps along with that of African wild rice (*Oryza barthii* A.Chev.), then moved early to India and developed in parallel on the two continents. *Echinochloa esculenta* was instead the product of the domestication of some populations of the common barnyard grass (*E. crus-galli* (L.) P.Beauv.), phylogenetically sister of the crop in question (Sebastin *et al.*, 2019). The process may have started in the Yangtze basin (China), along with the domestication of Asian wild rice (*Oryza sativa* L. subsp. *rufipogon* (Griff.) De Wet), with which *E. crus-galli* shares the habitat. In fact, archaeological finds dating back about 10,000 years ago would testify the extensive consumption of *E. crus-galli* caryopses as a basis for survival, together with those of wild rice (Yang *et al.*, 2015). The subsequent evolution of the crop may have found an important secondary center of selection in Japan, to later extend to other areas of temperate Asia. In any case, the experimental hybrids both between ancestors (*E. colona* × *E. crus-galli*) and between descendants (*E. esculenta* × *E. frumentacea*) confirm the consistency of the assumpted wild-crop lineages. In fact, these hybrids show meiotic irregularities, univalents, laggards and micronuclei. On the contrary, in the crosses between presumed ancestor and descendant (i.e., *E. colona* × *E. frumentacea*, *E. crus-galli* × *E. esculenta*) meiosis proceeds without obstacles as expected (Sood *et al.*, 2015). What interests us is the taxonomic aspect, resolved for *E. esculenta* but not for *E. frumentacea*. In fact, we start from the principle that the appropriate rank for each intraspecific component of a wild/domestic/feral tern is that of subspecies (Harlan & De Wet, 1971), as already done by ourselves on other taxa (Banfi *et al.*, 2017; Galasso *et al.*, 2018). Fortunately, the appropriate combination for *E. esculenta* already exists, while none is available for *E. frumentacea*. Therefore, it is necessary to establish it in accordance with the International Code of Nomenclature, hereafter ICN (Turland *et al.*, 2018).

Echinochloa colona (L.) Link subsp. ***edulis*** (Honda) Banfi & Galasso, **comb. nov.**

bas.: *Echinochloa crus-galli* (L.) P.Beauv. subsp. *edulis* Honda, J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 3(1): 266. 1930 [4 Dec 1930] (Art. 58 of the ICN)

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Received for publication: 20 October 2020
Accepted for publication: 25 November 2020
Online publication: 26 May 2021

≡ *Panicum frumentaceum* Roxb., Fl. Ind. (Carey & Wallich ed.) 1: 307. 1820 [prob. Jan-Jun 1820], non Salisb. [1796], nom. illeg. (Art. 53 of the ICN)
≡ *Echinochloa frumentacea* Link, Hort. Berol. [Link] 1: 204. 1827 [1 Oct-27 Nov 1827]
≡ *Oplismenus frumentaceus* (Link) Kunth, Révis. Gramin. 1(3): 45. 1829 [Apr 1829]
≡ *Panicum crus-galli* L. var. *frumentaceum* (Link) Trimen, Syst. Cat. Fl. Pl. Ceylon: 104. 1885 [Jun_Jul 1885]
≡ *Echinochloa crus-galli* (L.) P.Beauv. var. *frumentacea* (Link) W.Wight, Century Dict. Cyclop. 12: 810. 1909
≡ *Echinochloa crus-galli* (L.) P.Beauv. var. *edulis* Hitchc., Bull. U.S.D.A. 772: 238. 1920, nom. illeg. (Art. 52 of the ICN)
≡ *Echinochloa colona* (L.) Link var. *frumentacea* (Link) Ridl., Fl. Malay Penins. 5: 223. 1925 [1-6 Aug 1925]
≡ *Panicum crus-galli* L. var. *edule* Makino & Nemoto, Fl. Japan. (Makino & Nemoto): 1470. 1925, nom. illeg. (Art. 52 of the ICN)
– *Echinochloa crus-galli* (L.) P.Beauv. var. *frumentacea* (Link) E.G.Camus & A.Camus [1922], isonym
– *Panicum crus-galli* L. var. *edule* Thell. ex B.de Lesd. [1934], isonym

Note: All these names are based on the illegitimate *Panicum frumentaceum* Roxb., a later homonym of *Panicum frumentaceum* Salisb. According to Art. 11.2 of the ICN, a name has no priority outside the rank at which it is published. Therefore, the epithet *frumentacea* has priority at specific and varietal rank, while *edulis* at subspecific rank.

Echinochloa crus-galli (L.) P.Beauv. subsp. ***utilis*** (Ohwi & Yabuno) T.Koyama, Grasses Japan: 503. 1987.
≡ *Echinochloa utilis* Ohwi & Yabuno, Acta Phytotax. Geobot. 20(1): 50. 1962 [30 May 1962]
≡ *Echinochloa crus-galli* (L.) P.Beauv. var. *utilis* (Ohwi & Yabuno) Kitam., Acta Phytotax. Geobot. 36(1-3): 93. 1985 [June 1985]
= *Panicum esculentum* A.Braun, Index Seminum [Berlin] 1861(App.): 3. 1862 [25 Mar 1862]
≡ *Echinochloa esculenta* (A.Braun) H.Scholz, Taxon 41(3): 523. 1992 [15 Aug 1992]

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