

Emended Diagnosis, Description, and Type Citation for *Cucumis melo* subsp. *meloides*, the Progenitor of the African Domestication of *C. melo*

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This is a continuation of our efforts to clarify the taxonomy of *Cucumis*, which despite receiving a lot of attention from plant breeders and molecular-developmental biologists, is lacking modern taxonomic treatments. The only complete treatment of the genus, Kirkbride's (1993) monograph, is greatly outdated, covering only 32 of the 66 species currently recognized in *Cucumis* (Sebastian et al., 2010; Renner, 2024; and <https://cucurbit.de/calycophysum/cucumis/>). Two more species new to science have recently been discovered in Madagascar and await formal description (Andriamiharisoa et al., 2025).

Kirkbride synonymized no fewer than 522 names published under *Cucumis melo* and then subdivided the thousands of collections into two clusters, subspecies *melo* and subspecies *agrestis*, based on ovary pubescence. As shown with molecular characters, these two clusters are unnatural, with accessions instead clustering by geographic origin and not ovary pubescence or wild/cultivated origin (Endl et al., 2018). The study by Endl et al. (2018) showed that modern melon cultivars go back to two lineages that diverged ca. 2 million years ago. One is restricted to Asia (*Cucumis melo* subsp. *melo*), and the second, first described in their study, *C. melo* subsp. *meloides*, to Africa. The Asian lineage has given rise to the widely commercialized cultivar groups and their market types, while the African lineage gave rise to cultivars like the Tibish melons still grown in the Sudan region. The African sister clade to all other *C. melo* accessions has also been confirmed with more intense sequencing effort by Zhao et al. (2019), who found African wild melon accessions grouping with the tibish melons. Endl et al. (2018) also showed that *C. trigonus* Roxb., an overlooked perennial and drought-tolerant species from India, is among the closest living relatives of *C. melo*.

By oversight, Endl et al. (2018) failed to fulfill certain formal requirements when publishing the newly understood subspecies, creating a nomenclatural problem that we here remedy. This is important for two reasons. Firstly, the name

Cucumis melo subsp. *meloides* is now being used in other studies (e.g., Imoh et al., 2025) and secondly, the repeated independent domestication of honey melons is the subject of ongoing research efforts that will benefit from an up-to-date system of taxon names, reflecting phylogenetic and geographic insights about relationships.

The name *Cucumis melo* L. subsp. *meloides* was proposed in Endl et al. (2018, Appendix S4), but that Appendix was a word document, while the Code of Botanical Nomenclature requires names to be published in printed form or in pdf file, with an ISSN.

We now provide a formal diagnosis and description of *Cucumis melo* L. subsp. *meloides* Endl & H.Schaefer, subspecies nova, followed by a brief discussion of this subspecies.

Holotype: *K.G.T. Kotschy 107* (M), "Ad montem Cordofanum Arasch-Cool [Sudan] in planatie serpens; d. 2 Oct. 1839.", **Figure 1**. Isotypes: BR, K, M, MPU, TUB. Paratype: *K.G.T. Kotschy 352* (CAL, HAL, HBG, MPU, P, TUB).

Cucumis melo "melon sauvage d'Afrique" sensu Naudin (1859); *Cucumis ambigua* Fenzl ex Hook.f., Fl. Trop. Afr. [Oliver et al.] 2: 543. 1871, nom. inval.; *Cucumis cognata* Fenzl ex Hook.f., Fl. Trop. Afr. [Oliver et al.] 2: 543. 1871, nom. inval.; *Cucumis melo* L. var. *agrestis* auct., non Naudin (1859).

Diagnosis: Compared to *C. melo* subsp. *melo*, the middle lobe of the leaf is much longer, two to three times as long as the lateral lobes, while it is usually less than twice as long as the lateral ones in *C. melo* subsp. *melo*. In the nuclear ribosomal ITS region, the new subspecies differs from *C. melo* subsp. *melo* by 10 substitutions in ITS1 and ITS2 and an insertion-deletion of 4 nucleotides in ITS1.

Description (Figure 2): Monoecious annual or short-lived perennial creeper or climber with hispid shoots reaching a length of 1–3 m, becoming woody at base. Leaves ovate with cordate base, usually palmately 3(-5)-lobed with middle lobe 2–3× as long as lateral lobes, scabrid-hairy; petiole up to 10 cm long, scabrid-hairy. Male flowers solitary or in fascicles of up to 4 flowers, pedicels up to 2.5 cm long; receptacle-tube 3–6

mm long, its lobes linear-lanceolate, up to 6 mm long; petals yellow 5–10 × 3–8 mm. Female flowers solitary, pedicels up to 5 cm long, perianth similar to male flowers; ovary elliptic, densely pubescent. Fruits egg-shaped, small (3–5 × 2–3 cm, 20–40 g), smooth, light green with dark green dots or stripes, fruiting pedicel up to 5–6 cm long. The flesh is light green, very thin, moderately to strongly bitter; three placentas, no cavity between them. Seeds pale, elliptic, small, compressed, 5–8 × 2.5–4 × 1 mm, in a gelatinous pulp.

Distribution: Africa, from the Cape Verde archipelago in the West to Sudan and Egypt in the East. The sub-Saharan distribution is still unclear due to confusion with escaped (feral) cultivated *C. melo* subsp. *melo* cultivars.

Habitat: Dry savanna and semidesert areas, in Cape Verde also found on disturbed ground close to settlements.

Pollination biology: In Cape Verde, flowers are visited by different fly species (Diptera) and small halictid bees (*Ceylalictus* sp., *Halictus* sp.).

Seed dispersal: In Cape Verde and probably elsewhere, the fruits are eaten by (feral) donkeys who disperse the seeds over long distances (Figure 3).

Unfortunately, there are several Kotschy collections with the same number but from different countries and representing different plant families. Thus, *Kotschy* 352 from Iran, with duplicates in at least 11 herbaria, is a lectotype of *Convolvulus acanthocladus* Boiss. & Kotschy, and another *Kotschy* 352 from Turkey and preserved in the Harvard herbaria is an isotype of the Caprifoliaceae *Pterocephalus pyrethrifolius* Boissier & Hohenacker.

Archaeobotanical and molecular evidence suggests that melon domestication occurred independently not only in Northeast Africa and in India (Endl et al., 2018), but perhaps a third time in the lower Yangtze region of China (Schaefer and Renner, 2021). The archaeobotanical evidence consists of the seeds, which prove the presences of melons at a particular site and time, and the increase of seed size during the domestication process. Other evidence comes from genetic diversity in particular regions, such as Sudan. Thus, a recent study of African melon germplasm (Imoh et al., 2025) sampled several accessions from Sudan, including two (CUM 287 and PI 185111) identified as belonging to *C. melo* subsp. *melooides* by sequence polymorphism at seven chloroplast regions and one nuclear region that matched the *melooides* sequences generated by Endl et al. (2018). Of these, CUM 287 belonged to a group with Tibish accessions. Among the 13 accessions in this group, four were small-fruited (cf. our Figure 1 of *C. melo* subsp. *melooides* fruits and seeds).

In conclusion, *Cucumis melo* subsp. *melooides*, described here, represents a taxon known at least since the times of Naudin and using its formal name helps communicate modern insights on trait evolution and domestication of *C. melo*.

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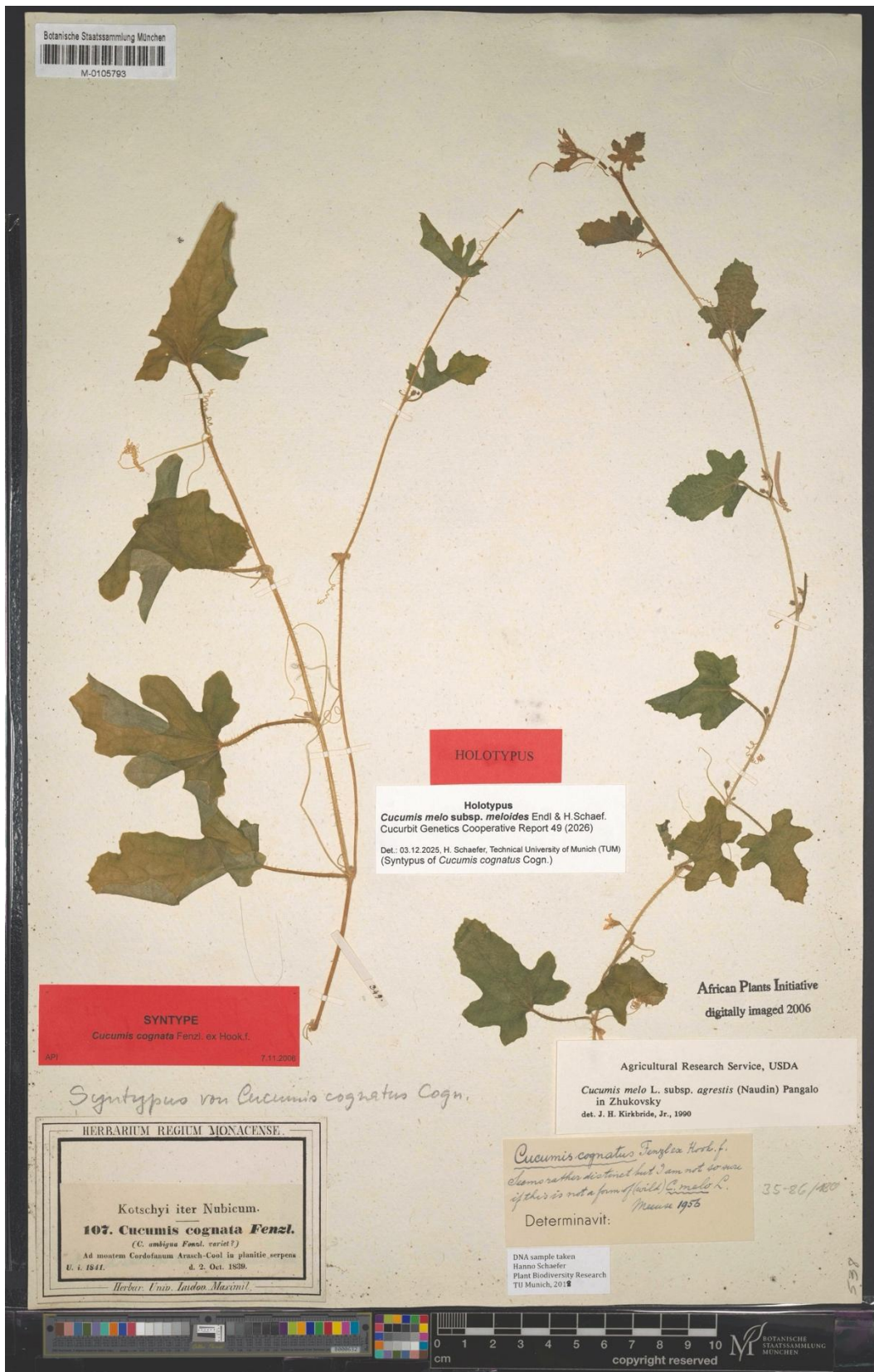


Figure 1. The type specimen of *Cucumis melo subsp. meloides* collected by G.C.T. Kotschy in Sudan, Province Sennar, and deposited in the Munich herbarium (acronym M).



Figure 2. *Cucumis melo* subsp. *meloides* shoot with male flower and fruit (left) and longitudinally cut fruit (3.5 cm long) showing the large number of small cream-white seeds (right); Sal, Cape Verde, Oct. 2015.



Figure 3. The natural habitat of *Cucumis melo* subsp. *meloides* in Boavista, Cape Verde, with feral donkeys (*Equus asinus*) that eat the fruits and disperse the seeds.