Notes on *Citrullus* spp. and *Acanthosicyos naudinianus* - Pollen Morphology and Interspecific Hybridization.

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Abstract

Scanning electron (SEM) and light microscopy were utilized to examine pollen of the currently recognized species (and forms) within the genus *Citrullus, and Acanthosicyos naudinianus* (*Cucurbitaceae*). Pollen of all species/forms were similar in shape differing slightly in their polar (P) and equatorial (E) axes and P/E. In general, all were characterized as prolate and tricolpate with a small polar area and reticulate ornamentation. Mutations affecting pollen ornamentation were identified in PIs 482261 and 482312 (*C. amarus*) from Zimbabwe. Pollen of other *C. amarus* accessions was reticulate. F_1 hybrids between *C. colocynthis* (PI 652554) and *A. naudinianus* (GRIF 14032) possessed characteristics that were intermediate between the parents.

In general, our data support earlier observations on pollen of *CiItrullus* spp. for which data are available. All specimens were 3-colporate and reticulate (or in two unique instances rugulate). However, the pollen grains observed in the present study were prolate having a polar axis/equatorial axis between 1.33 and 2.0 (Erdtman, 1943) being more elongate along their polar axis than reported by Marticorena (1963) (Fig. 1). The methods used to prepare the pollen reported in earlier studies are unclear. The differences in pollen size and shape reported here may be due to differences in the methods used in these earlier studies to fix or observe the pollen grains prior to or during their microscopic examination, or due to genetic effects. Variability in pollen size both within and among accessions was observed (Fig. 1) in the present study. Environmental effects may also be a factor.

Erdtman G (1943). An Introduction to Pollen Analysis. Chronica Botanica. Waltham MA.

Marticorena C (1963). Material para una monografia de la morfologi a del polen de *Cucurbitaceae.* Grana Palynol. 4:78-91.

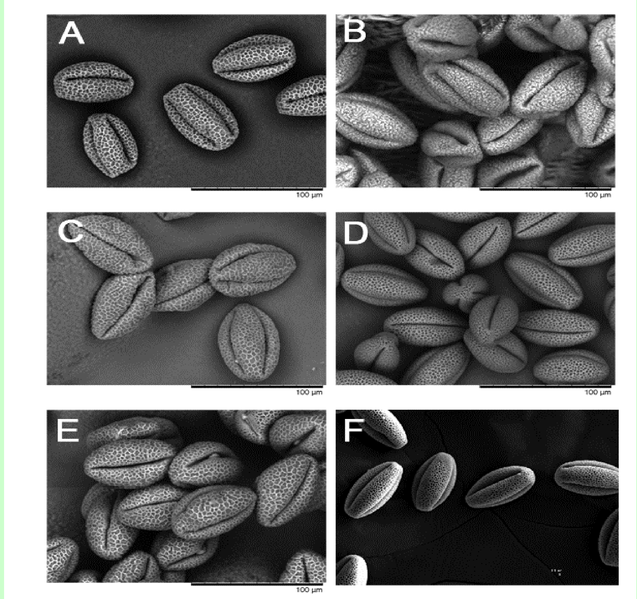

Figure 1. SEM photographs of pollen grains of: A) *C. lanatus* cv. Sugar Baby, B) *C. lanatus* (egusi) PI 665007, C) *C. rehmii* PI 670011, D) *C. ecirrhosus* PI 673135, E) *C. colocynthis* PI 652554 and F) *A. naudinianus* G14032.

Two exine mutants were detected among the *C. amarus* accessions examined. Other *C. amarus* accessions were reticulate.

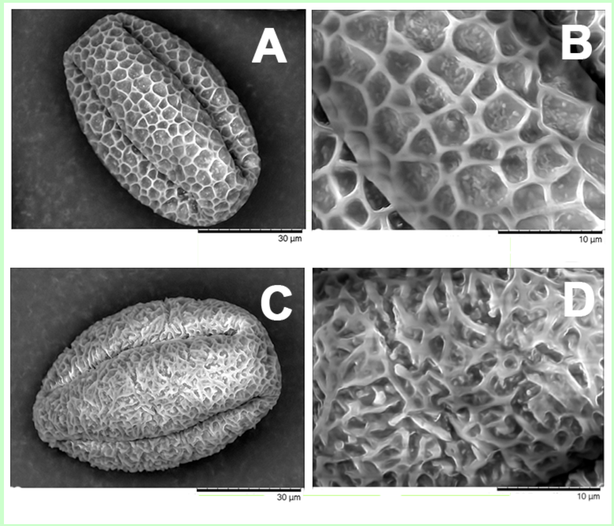

Figure 2. Pollen ornamentation of PI 482309 - *C. lanatus* cv. Sugar Baby (A and B) and *C. amarus* (citron-type) PI 482261 (C and D).

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The exine of PIs 482261 (mutant) and PI 482309 (normal) *C. amarus* were readily distinguishable via light microscopy. (Fig. 3).

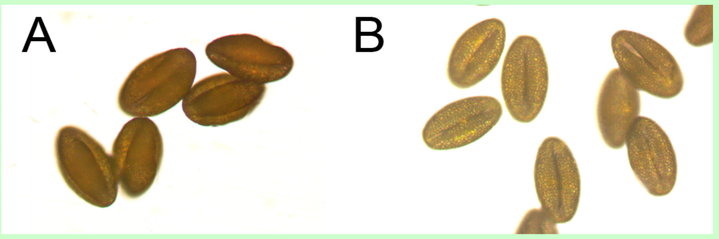

Figure 3. Pollen of (A) PI 482261 (mutant) and PI 482309 (normal) *C. amarus* as observed via light microscopy.

Pollen of (A) PI 482261 (mutant) and (B) PI 482312 (mutant) were distinguishable from each other via SEM (Fig. 4 A and B).

Hybridization of *C. colocynthis* with *A. naudinianus* resulted in viable seed The hybrid plants produced a storage root like the female parent (Fig. 4 – right)

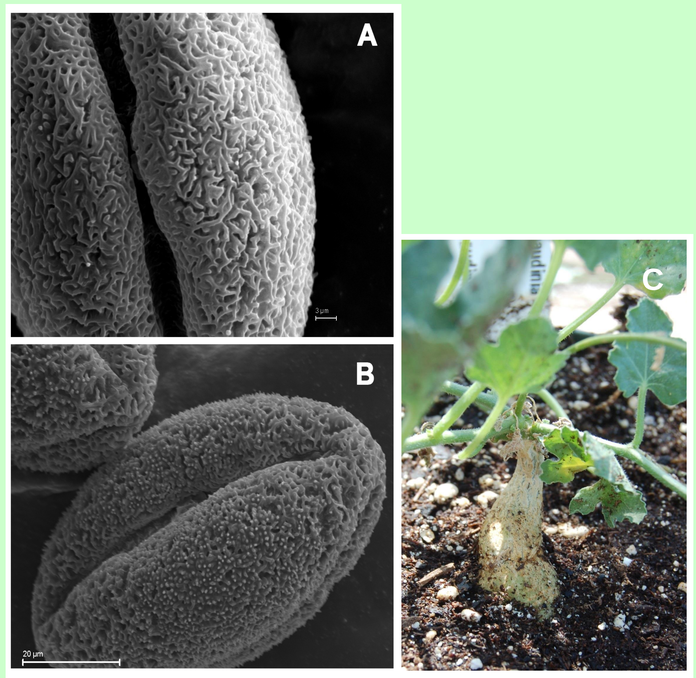

Figure 4. Left. Rugulate pollen ornamentation of citron-type *C. amarus* (A) PI 482261 and (B) PI 482312. Right. Storage root of a *C. colocynthis* (PI 652554) x A. *naudinianus* (G14032) hybrid.