Note on the seed morphology of *Entada polyphylla* (Leguminosae, Mimosoideae) and its taxonomic significance in *E.* sect. *Entadopsis*

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RESUMO

Nota sobre a morfologia da semente de *Entada polyphylla* (Leguminosae, Mimosoideae) e sua significância taxonômica em *E.* sect. *Entadopsis*. *Entada* sect. *Entadopsis* (Leguminosae, Mimosoideae) abrange três espécies neotropicais, *E. polyphylla*, E. *polystachya* e *E. simplicata*. Esta nota descreve e ilustra a morfologia da semente de *Entada polyphylla*, procurando avaliar sua relevância taxonômica em *E.* sect. *Entadopsis*. Os resultados demonstram que as sementes são variáveis na seção, fornecendo caracteres taxonômicos úteis em nível específico. As sementes de *Entada polyphylla* podem ser distintas daquelas de *E. polystachya* e *E. simplicata* especialmente pelos caracteres do embrião.

PALAVRAS-CHAVE: Embrião, Fabaceae, leguminosas, Mimoseae, testa.

ABSTRACT

Note on the seed morphology of *Entada polyphylla* (Leguminosae, Mimosoideae) and its taxonomic significance in *E.* sect. *Entadopsis*. *Entada* sect. *Entadopsis* (Leguminosae, Mimosoideae) encompasses three Neotropical species, *E. polyphylla*, *E. polystachya,* and *E. simplicata*. This note describes and illustrates the seed morphology of *Entada polyphylla*, aiming to evaluate its taxonomic value within *E.* sect. *Entadopsis.* The results support the view that seeds are quite variable in the section, providing taxonomic characters useful at the species level. Seeds of *Entada polyphylla* can be distinguished from those of *E. polystachya* and *E. simplicata* especially by their embryo characters.

KEY WORDS: Embryo, Fabaceae, legume, Mimoseae, testa.

INTRODUCTION

Entada Adans. (Leguminosae, Mimosoideae) comprises 28 species (Luckow 2005). In Brazil, only three species have been recorded, especially along the Amazon basin (Rodrigues & Flores 2012): *E. polyphylla* Benth., *E. polystachya* (L.) DC., and *E. simplicata* (Barneby) Sch. Rodr. & A.S. Flores. These species belong to *E.* sect. *Entadopsis* (Britton) Brenan and occur exclusively in the Neotropics (Brenan 1966; Rodrigues & Flores 2012).

Seed morphology is taxonomically useful in *Entada* (Brenan 1966; Gunn 1984), especially regarding its Old World species (Brenan 1966; Lungu & Culham 1996; Tateishi et al. 2008). In addition, Rodrigues et al. (2014) found several quantitative and qualitative differences between seeds of *E. polystachya* and *E. simplicata*. Nevertheless, to my knowledge, no previous study concerning seed morphology of *E. polyphylla* has been carried out. This species occurs mainly along the Amazon Basin, with records to Puerto Rico (Barneby 1996).

This note describes and illustrates the seed morphology of *Entada polyphylla*, aiming to evaluate its taxonomic value within *E.* sect. *Entadopsis*.

Descriptive terminology and methods followed Gunn (1984) and Rodrigues *et al.* (2014). Vouchers are housed at the Herbarium of the Museu Integrado de Roraima (MIRR): E. S. Braga *et al.* 73 and E. S. Braga *et al.* 74.

RESULTS AND DISCUSSION

Seeds of *Entada polyphylla* - Seeds 20-24 mm long, 10-13 mm wide, 1-1.5 mm thick, oblong to elliptic, flattened, symmetrical (Figure 1A), and in a single transverse non-overlapping series. Testa dark brown, chartaceous, smooth, pleurogrammatic, having a 90-100% pleurogram (Figures 1A, C), adnate patches of endocarp tissues absent; fracture lines absent (Figure 1C); funicular impression on the testa surface near the seed apex absent. Hilum punctiform, apical (Figure 1B), aril absent. Lens 0.5-0.6 mm long, with similar color to the testa, shorter than the radicle lobe in height. Endosperm absent. Cotyledons 19-22.2 mm long, 9.5-12.3 mm wide, 0.5-0.8 mm thick, oblong to elliptic, with a strongly asymmetric lobed base (Figures 2A-E) and a rounded apex; cotyledon lobes 0.8-1 mm long; cotyledonary petioles 0.7-1 mm long (Figures 2B-D), Radicle 0.6-1 mm long, 0.8-1 mm wide, triangular to ovate (Figure 2A-B), exposed, notched. Plumule 0.7-1 mm long, moderately developed, bipartite (Figures 2D-E).

Seeds of *Entada* sect. *Entadopsis* - This work provides data for *E. polyphylla* seeds that can be compared with those of the other two species of *E.* sect. *Entadopsis*, *E. polystachya* and *E. simplicata* (Rodrigues et al. 2014). There are several seed traits shared by the three species of *E.* sect. *Entadopsis*. Their seeds are oblong to elliptic, flattened, symmetrical and in a single transverse non-overlapping series. The testa is dark brown, chartaceous, pleurogrammatic, having a 90-100% pleurogram. The hilum is punctiform, apical, and both aril and endosperm are absent. The embryo has oblong to elliptic cotyledons, with a lobed base and a rounded apex. The embryonic axis is straight, and the plumule is moderately developed.

Although seeds of *E. polyphylla* superficially resemble those of the other two species of *E.* sect. *Entadopsis*, some embryo characters markedly provide to be diagnostic (Table 1). *Entada polyphylla* has developed cotyledonary petioles (0.7-1mm long), whereas both *E. polystachya* and *E. simplicata* have inconspicuous cotyledonary petioles

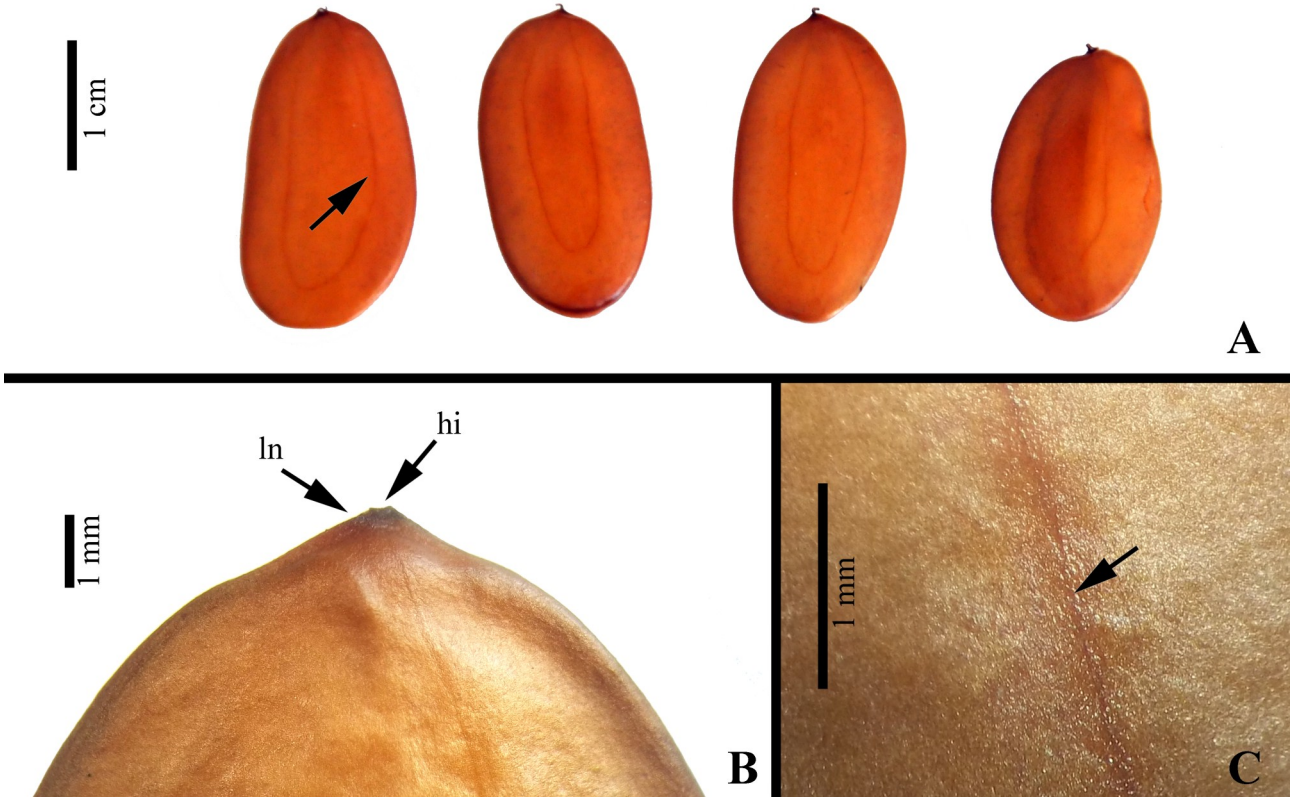

Figure 1. Seed morphology of *Entada polyphylla* Benth. A. Seeds. B. Detail of the hilum region, showing the lens (ln) and the hilum (hi). C. Detail of the testa, showing the pleurogram (arrow); observe that fracture lines are lacking (*E. S. Braga et al. 74*).

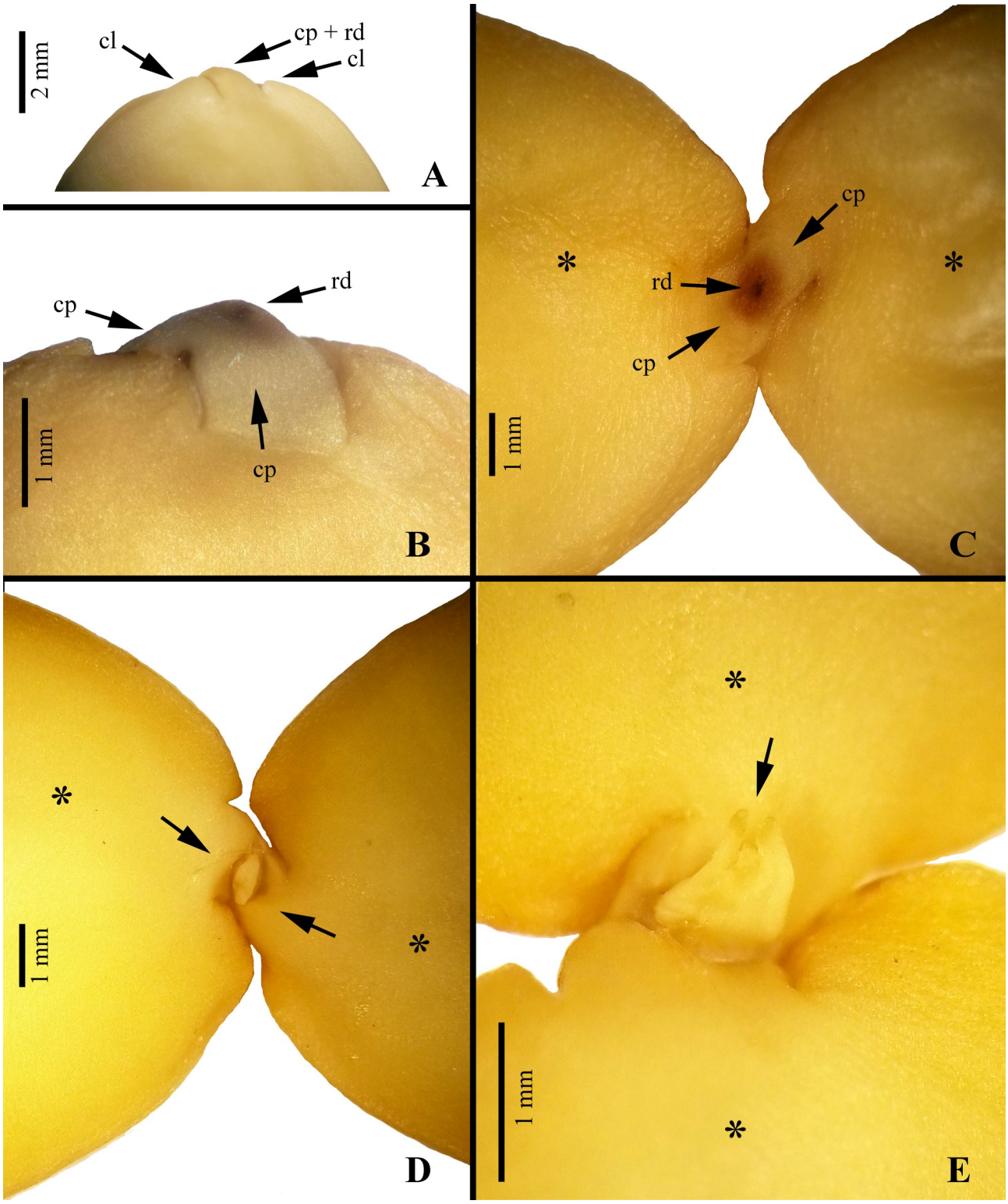

Figure 2. Embryo of *Entada polyphylla* Benth. A. Cotyledon lobes (cl), showing a fully exposed radicle (rd) and a cotyledonary petiole (cp). B. View of the radicle (rd) and cotyledonary petioles (cp) region. C. Abaxial view of both cotyledons (asterisks), showing the cotyledonary petioles(cp) and the radicle (rd). D. Adaxial view of both cotyledons (asterisks), arrows showing the cotyledonary petioles. E. Adaxial view of both cotyledons (asterisks), arrow showing the plumule (*E. S. Braga et al. 74*).

(Rodrigues et al. 2014). In *E. polyphylla*, cotyledon lobes are asymmetrical and relatively short (≤1mm long). On the other hand, both *E. polystachya* and *E. simplicata* have

Table 1. Summary of seed diagnostic characters in *Entada* sect. *Entadopsis* taxa.

Characters/Taxa	*E. polyphylla*	*E. polystachya*	*E. simplicata*
Testa fracture lines	absent	present	absent
Testa funiculus impression	absent	absent	generally present
Relative height of lens to radicle	shorter than the radicle lobe	equal to radicle lobe	shorter than the radicle lobe
Lens coloration	similar to testa	dissimilar to testa	similar to testa
Cotyledon petioles	developed, 0.7-1 mm long	inconspicuous	inconspicuous
Cotyledon lobes	asymmetrical; 0.8-1 mm long	symmetrical; 2.8-3.8 mm long	symmetrical; 1.5-1.8 mm long
Radicle	triangular; 0.6-1 mm long, fully exposed	bulbose; 3.7-4.7 mm long, partially exposed	triangular; 2.4-2.7 mm long, partially exposed
Data source	present work	Rodrigues *et al*. (2014)	Rodrigues *et al*. (2014)

symmetrical and longer cotyledon lobes (≥1.5 mm long) (Rodrigues et al. 2014). In addition, *E. polyphylla* has a short (≤1mm long) and fully exposed radicle, while both *E. polystachya* and *E. simplicata* possess a longer (≥2.4 mm long) and partially exposed radicle (Rodrigues et al. 2014).

As a conclusion, the results obtained here for *Entada polyphylla* reinforce that seeds are quite variable in *E*. sect. *Entadopsis* (Rodrigues et al. 2014), providing taxonomic characters useful at the species level. *Entada polyphylla* seeds can be distinguished from those of *E. polystachya* and *E. simplicata* especially by their embryo characters.

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