Acacia colei var. *ileocarpa* (Leguminosae: Mimosoideae), a new taxon from the tropical dry-zone of north-west Australia

M.W. McDonald[1] and B.R. Maslin[2]

[1]CSIRO, Forestry and Forest Products, PO Box 4008, Queen Victoria Terrace, Canberra, Australian Capital Territory 2600
[2]Western Australian Herbarium, Department of Conservation and Land Management, Locked Bag 104, Bentley Delivery Centre, Western Australia 6983

Abstract

M.W. McDonald and B.R. Maslin. *Acacia colei* var. *ileocarpa* (Leguminosae: Mimosoideae), a new taxon from the tropical dry-zone of north-west Australia. Nuytsia 11(2): 219-223 (1997). *Acacia colei* var. *ileocarpa* M.W. McDonald & Maslin, a newly recognized variant of *A. colei* Maslin & L.A.J. Thomson, is described, illustrated and its natural distribution mapped. This variety differs most significantly from var. *colei* by its tightly, irregularly coiled or twisted pods which are very similar to those found on the related species *A. holosericea* A. Cunn. ex Don and *A. neurocarpa* A. Cunn. ex Hook.

Introduction

In their reappraisal of the taxonomy of *Acacia holosericea* A. Cunn. ex Don (Leguminosae: Mimosoideae: section *Juliflorae),* Maslin & Thomson (1992) described *A. colei* as a new species and noted a putative hybrid involving *A. colei* Maslin & L.A.J. Thomson and *A. neurocarpa* A. Cunn. ex Hook. (represented by *Thomson* LXT 1291-95 and 1300-05, all PERTH). Recent field studies and an examination of herbarium material now show this entity to be a variety of *A. colei*, described here as var. *ileocarpa.* It differs most significantly from the typical variety by its tightly, irregularly coiled or twisted pods (which are very similar to those found in the related species *A. holosericea* and *A. neurocarpa*). Variety *ileocarpa* has commonly been misidentified as *A. holosericea* or *A. neurocarpa* or as a hybrid between *A. colei* and either *A. holosericea* or *A. neurocarpa.* Both varieties of *A. colei* have become widely planted in tropical dry-zones of West Africa (such as Senegal and Niger) where they are grown for amenity purposes, fuelwood production and, more recently, for human food.

Taxonomy

Acacia colei var. *ileocarpa* M.W. McDonald & Maslin, *var. nov.* (Figure 1)

A varietate typica leguminibus arcte irregulariter tortuosis differt.

Typus: about 38 km east of Gibb River turnoff at Derby, on road to King Leopold Range, Western Australia, 13 October 1992, *B.R. Maslin* 7219 (*holo:* PERTH 2571714; *iso:* CANB, K).

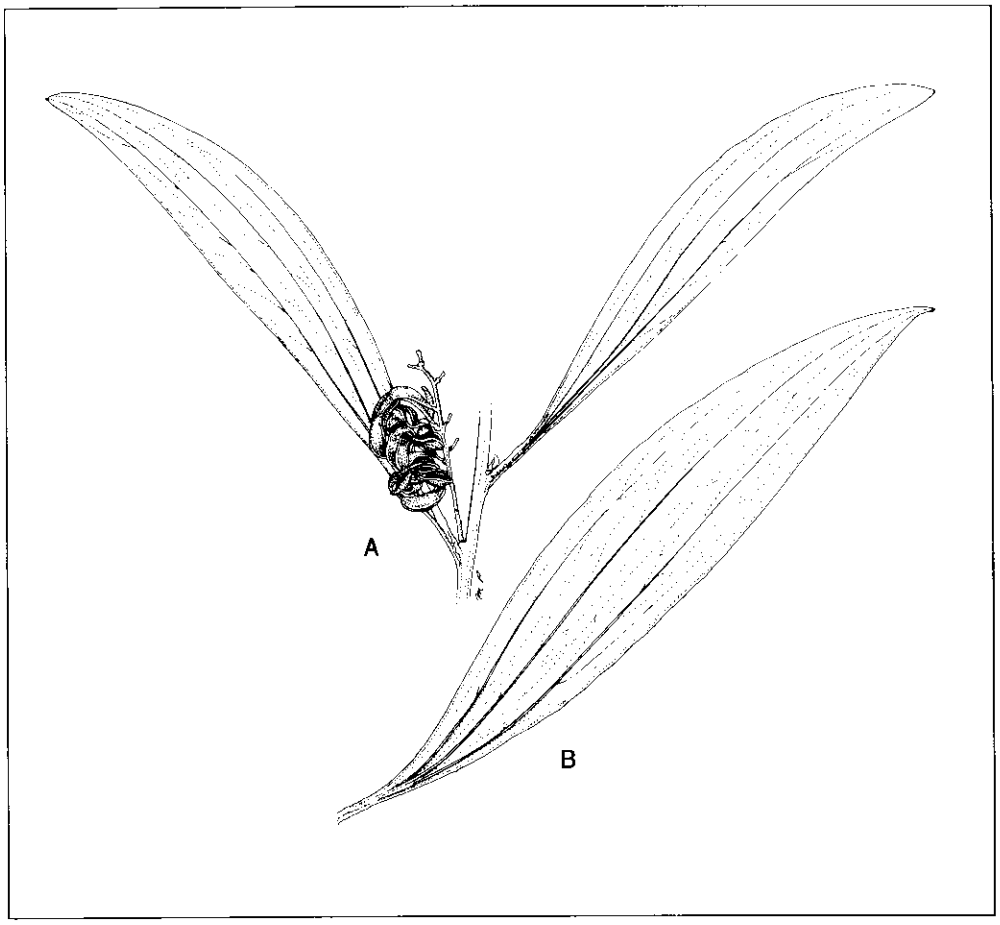

Figure 1. *Acacia colei* var. *ileocarpa* A - portion of fruiting branchlet (x0.5); B - larger than normal phyllode (x0.5). Drawn from *M. McDonald* 1936 (A) and *A.N. Rodd* 2837 (B).

Differs most significantly from *A. colei* var. *colei* in having tightly, irregularly coiled or twisted pods (curved, sometimes into an open circle, in *var. colei*). Other differences include its often orange-coloured terminal branchlets (brown in var. *colei*), commonly narrower phyllodes 10-25(40) mm wide (20-45(55) mm in var. *colei*) and slightly shorter seeds 3-3.5(4) mm long (3.5-4 mm in var. *colei*).

Selected specimens examined. WESTERN AUSTRALIA: between Rober [Robe River] and Millstream, *H. Demarz* 7663 (BRI, PERTH); Gibb River road, 68.2 km SE of Windjana Gorge turnoff, *C.E. Harwood & M. McDonald* CEH 474 (PERTH); Rockhole Creek, 11 km SW of Halls Creek on Great Northern Highway, *B.R. Maslin* 7306 (PERTH); Great Northern Highway, 16 km SW of Halls Creek (*c.* 1 km NE of turnoff to Carranya Station at Koongie Park), *B.R. Maslin* 7155 (PERTH); *c.* 400 m S of the Negri River crossing, 136.6 km S along Duncan Highway (from turnoff at Victoria Highway), *M. McDonald* 1931 (PERTH); "Palm Springs" (tributary of Fortescue River), 11 km W of Millstream Station, *A.N. Rodd* 2837 (PERTH); 17 km E of Halls Creek on Duncan Highway, *L. Thomson* LXT 1291-1295 (all PERTH); Koongie Park, 0.1 km N of Tanami road turnoff on Great Northern Highway, *L. Thomson* LXT 1300-1303 (all PERTH); 4.5 km S of Great Northern Highway on Tanami road, *L. Thomson* LXT 1305 (PERTH).
NORTHERN TERRITORY: 7 km SE of Negri River on Duncan Highway, SSE of Kununurra, *B.R. Maslin* 7120A (PERTH); 23.6 km S of the Negri River crossing along the Duncan Highway, *M. McDonald* 1936 (PERTH).

Distribution. Acacia colei var. *ileocarpa* has a scattered distribution in the southern Kimberley region of Western Australia, it extends eastward to the western extremity of Northern Territory at the Negri River. It also occurs in the Pilbara region of Western Australia where it appears to be restricted to the Fortescue River drainage system. This Kimberley-Pilbara disjunct distribution pattern is not uncommon in *Acacia* and occurs also in other genera. The distributions of both var. *ileocarpa* and var. *colei* are shown in Figure 2. Although populations of var. *colei* and var. *ileocarpa* are normally allopatric some sympatric occurrences are known from a few locations in the Kimberley region, including Luluigui Station (west of Fitzroy Crossing), south of the Negri River crossing on the Duncan Highway (south of Kununurra) and at Rockhole Creek (south of Halls Creek). Herbarium specimens suggest that sympatry may occur in some Pilbara populations but this needs to be confirmed by further field observations.

Habitat. In the southern Kimberley var. *ileocarpa* occurs in proximity to floodplains and drainage lines on clay loams (pH 5.5-6.5) derived from alluvia or limestone. It is commonly found in open or low open woodlands dominated by *Corymbia grandifolia* (R. Br. ex Benth.) K.D. Hill & L.A.S. Johnson, *C. confertiflora* (F. Muell.) K.D. Hill & L.A.S. Johnson, *Eucalyptus pruinosa* Schauer, *Lysiphyllum cunninghamii* (Benth.) de Wit and shrub species such as *Acacia monticola* J.M. Black, *A. tumida* F. Muell. and *A. thomsonii* Maslin & M.W. McDonald. In the Pilbara it occurs on alkaline sandy loam (pH 7.5-8.5) associated with tall open shrublands of *A. bivenosa* DC., *A. farnesiana* (L.) Willd., *A. ancistrocarpa* Maiden & Blakely and sometimes open woodlands of *Eucalyptus leucophloia* Brooker. Also found colonizing disturbed soils along roadsides.

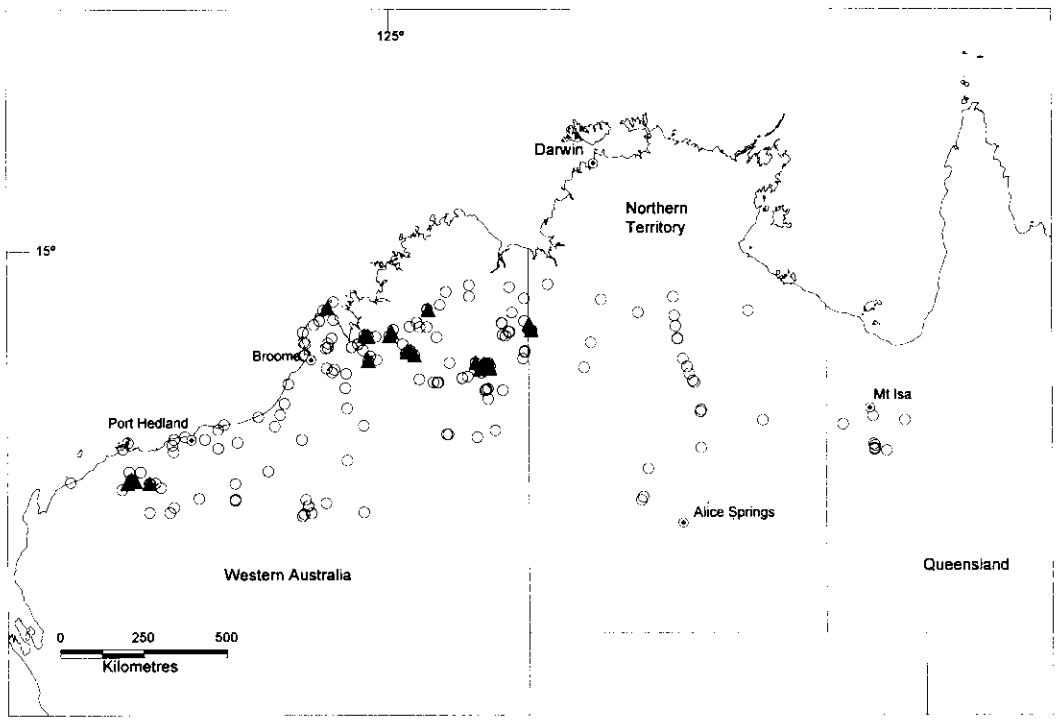

Figure 2. Distribution of *A. colei* var. *colei* (open circles) and *A. colei* var. *ileocarpa* (closed triangles).

Flowering and fruiting period. Variety *ileocarpa* flowers during June-July and pods mature September-November. Variety *colei* has essentially the same flowering and fruiting period (see Maslin & Thomson 1992).

Variation. Plants of var. *ileocarpa* display a range of variation in phyllode size and shape similar to or perhaps even greater than var. *colei*. Variety *ileocarpa* phyllodes are commonly 10-25 mm wide and as such tend to be slightly narrower (and often more attenuate) than those of var. *colei*. However, plants with wider than normal phyllodes (to 40 mm across and clearly within the range of variation for var. *colei*) occur scattered throughout the geographic range of the taxon (e.g. *A.N. Rodd* 2837, see Figure 1B). Further field work is required to ascertain whether these specimens represent collections from young plants, because many taxa in this group have a tendency to produce larger than normal phyllodes during this phase.

Plants of var. *ileocarpa* from the Kimberley region have seeds 3-3.5 mm long and this appears to be a slight, but consistent, difference from var. *colei* which occurs in the same area (seeds 3.5-4 mm long). In the Pilbara region, however, the seeds of var. *ileocarpa* tend to be slightly longer (to 4 mm).

Affinities. In the absence of pods it is normally difficult to distinguish var. *ileocarpa* from var. *colei*. Judging from both field and herbarium observations pod curvature appears to be a consistent and reliable difference between the two varieties; even in sympatric populations no intergradation between the taxa has been observed for this character (see below under *Genetics*).

Acacia colei var. *ileocarpa* is most readily distinguished from *A. holosericea* and *A. neurocarpa* (all of which have similar pods) by its phyllodes which lack a gland at the base of their apical mucro, are shallowly recurved towards their apices (straight in *A. holosericea* and *A. neurocarpa*) and have a different nervation pattern (see Maslin & Thomson 1992 for details).

Genetics. The chromosome number (2n = 78) recorded from progeny of plants grown in Maradi, Niger, show var. *ileocarpa* to be hexaploid (Helen Stace, pers. comm.). This is the same ploidy level as reported by Moran *et al.* (1992) for var. *colei*. Moran also reported that *A. colei* has an unusual breeding system and that individuals within populations have the same allozymic genotypes. The apparent "fixed" nature of their genetic make-up (perhaps due to selfing or apomixis) may explain why morphologically intermediate individuals are not present where the two have sympatric occurrences.

Application of rank. In applying rank to this new taxon we have followed the basic premises outlined by Cowan & Maslin (1995), namely, that taxa are biological entities with an evolutionary history, and they generally have geographic integrity and some degree of morphological distinctness. It is the subjective assessment of the importance of the morphological differences that contributes heavily to our determining what rank is applied to taxa. Therefore, one's level of knowledge of the group being studied and capacity to assess the relative significance of variation patterns are important factors. Furthermore, the application of rank is commonly influenced by how past authors have regarded taxa within the group.

Based on current knowledge it appears that there is only a single character (i.e. pod curvature) that consistently and reliably distinguishes *A. colei* var. *ileocarpa* from var. *colei*. Thus, in the absence of pods (which occur on the plants for a relatively short period of time) it is normally not possible to confidently place specimens in one variety or the other. Future studies may well reveal additional distinguishing characters and elucidate the genetic basis of the variation, leading to our varieties being treated as separate species. While we could have here treated var. *ileocarpa* as a cryptic species this

would not be in keeping with the general approach to ranking which is currently applied in *Acacia*. We therefore consider it most appropriate to treat the taxon as a variety of *A. colei* even though it sometimes occurs sympatrically with the typical variety. We regard this as a pragmatic, albeit perhaps temporary, solution because it enables non-fruiting specimens to be classified at least to species.

Utilization. Both varieties of *A. colei* have shown potential for multipurpose use in tropical dry-zones of West Africa. In Senegal and Niger they have been grown as a source of fuelwood and for environmental rehabilitation (Thomson *et al.* 1994). Recently their seeds have been used as an alternative source of human food in these regions; the seeds are ground to produce a flour which can be incorporated into local recipes (Rinaudo *et al.* 1995). Farmers near Maradi, Niger have shown a clear preference for var. *ileocarpa* as it has good harvesting characteristics (Tony Rinaudo pers. comm.). Pods mature within a short period of time, the seeds are held in the pods after ripening and the compact clusters of pods are easy to harvest.

Conservation status. Not considered to be under threat.

Etymology. The varietal epithet is derived from the Latin - *ileum*, last part of the small intestine, alluding to the twisted and coiled state of its pods; and from the Greek - *carpa*, fruit.

Common name. "Curly-podded Cole's Wattle".

Acknowledgements

Margaret Pieroni is thanked for preparing the illustration (Figure 1). Ian Brooker prepared the Latin diagnosis; Doug Boland, Chris Harwood, Steve Hopper and Lex Thomson provided useful comments on the manuscript; and Tony Rinaudo is thanked for providing information on plants grown in Maradi, Niger. Field work has been supported in part by the Seeds of Australian Trees (SAT) project implemented by the Australian Tree Seed Centre funded by the Australian Centre for International Agricultural Research (ACIAR). The research was conducted at the Australian Tree Seed Centre and the Western Australian Herbarium.

References

Cowan, R.S. & Maslin, B.R. (1995). *Acacia* Miscellany 10. New taxa and notes on previously described taxa of *Acacia*, mostly section *Juliflorae* (Leguminosae: Mimosoideae), in Western Australia. Nuytsia 10: 15-62.

Maslin, B.R. & Thomson, L.A.J. (1992). Re-appraisal of the taxonomy of *Acacia holosericea* A. Cunn. ex Don, including the description of a new species, *A. colei*, and the reinstatement of *A. neurocarpa* A. Cunn. ex Hook. Australian Systematic Botany 5: 729-743.

Moran, G., Thomson, L., Grant, J. & Bell, C. (1992). Distribution of genetic variation within two dry-zone *Acacia* species and implications for their genetic improvement. *In*: House, A.P.N. & Harwood, C.E. (eds) "Australian Dry-zone Acacias for Human Food". pp. 74-81. (CSIRO: Melbourne).

Rinaudo, T., Burt, M. & Harwood, C.E. (1995). Growth and seed production of Australian *Acacia* species at Maradi, Niger. ACIAR Forestry Newsletter No.19. Australian Centre for International Agricultural Research, Canberra.

Thomson, L.A.J., Turnbull, J.W. & Maslin, B.R. (1994). The utilization of Australian species of *Acacia*, with particular reference to those of the subtropical dry zone. Journal Arid Environments 27: 279-295.