Aspidonepsis (Asclepiadaceae), a new southern African genus

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ABSTRACT

Aspidonepsis, an endemic southern African genus, is described and compared to the closely allied genus Aspidoglossum. This newly described genus is composed of two subgenera, Aspidonepsis and Unguilobium, consisting of three and two species respectively. Asclepias diploglossa, A. flava, A. cognata and A. reenensis are transferred to Aspidonepsis, and A. shebae is newly described. All species are discussed, illustrated and a key is given to aid in their identification.

INTRODUCTION

A.A. Bullock’s work on the family Asclepiadaceae (1952 to 1967) has received wide acceptance in Africa north of the Limpopo River. In southern Africa, however, his generic concepts and names have seldom been applied. This is explained partly by the fact that his research seldom included southern African plants and partly by the rejection of his work by Dyer (1975).

Unfortunately, three elements detract from Bullock’s work: 1, he admitted that his delimitation of genera was only tentative (1952); 2, when resurrecting or expanding existing genera he seldom gave new descriptions for these taxa. As a result, the generic circumscriptions and exact application of some of these names is still unclear; 3, his species concepts were very broad and there is now growing consensus that some species will need to be re-split.

Most southern African herbaria therefore still follow N.E. Brown’s treatment of the Asclepiadaceae as outlined in the Flora capensis (1907–1909). However, workers like N.E. Brown had followed the tradition of their time and separated genera using floral differences only. They even separated some genera on the basis of a single character. Phenomena like convergent evolution were seldom taken into account, and workers were unaware that the evolution of analogous floral morphologies had taken place within the family. Bullock (1952) was the first to realize that such convergent evolution had taken place and that many genera in the family not only contained a number of unrelated entities, but that these entities could only be identified in terms of consistently produced correlated character combinations. He was the first taxonomist to attempt a phylogenetically based classification for the African members of the tribe Asclepiadinae.

What Bullock has done at the generic level, N.E. Brown has accomplished at the specific level. Consequently the work of N.E. Brown (species delimitation) and Bullock (generic delimitation) should be seen as complimentary rather than antagonistic.

Recent investigations concerning the southern African members of the genus Asclepias sensu N.E. Brown have shown that Bullock’s generic concepts should be redefined and extended to embrace the taxa of this subcontinent (Nicholas 1981). Bearing in mind that the type species of the genus Asclepias L. is A. syriaca L., the authors agree with Bullock in the exclusion of Asclepias from Africa except as an adventive. The process of moving the southern African taxa of Asclepias sensu N.E. Brown to their correct generic position has already begun (Nicholas & Goyder 1990). The authors understand the desirability of giving a brief generic synopsis of the subtribe Asclepiadinae in Africa at this early stage of their work. However, as a number of genera still need to be: 1, resurrected from synonymy; 2, newly described; 3, extensively redefined; they feel that it is at present unwise to publish information that may change as their research progresses.

Aspidonepsis diploglossa (Turcz.) A. Nicholas & D.J. Goyder, A. flava (N.E. Br.) A. Nicholas & D.J. Goyder, A. cognata (N.E. Br.) A. Nicholas & D.J. Goyder, A. reenensis (N.E. Br.) A. Nicholas & D.J. Goyder and A. shebae A. Nicholas & D.J. Goyder form a phylogenetic unit quite distinct from the rest of Asclepias sensu N.E. Brown and can be distinguished from other genera in the tribe Asclepiadaceae by the following set of consistently present correlated characteristics:

1. a globose, fusiform or napiform tuber just below the soil surface;
2. a single erect stem (rarely up to 3 in A. flava);
3. spreading to ascending linear to narrowly elliptic leaves which are ranked up the stem;
4. inflorescences gathered together at the top of the flowering stem, even if nodally produced;

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5, persistent inflorescence bracts, often grading with the leaf system;
6, cucullate corona lobes which are produced 0.5 to 1.8 mm above the insertion of the corolla;
7, a saccate corona lobe cavity;
8, wishbone-shaped pollinaria, with semicircular to hemispherical pollinia.

Aspidonepsis is confined to high altitude grasslands of the Drakensberg and its foothills, although outlying populations of some species may be found in mountainous situations as far south as Grahamstown and on montane 'islands' nearer the Transkei-Natal coast. The northern limit of distribution of this endemic southern African genus is the eastern Transvaal. Species are usually, but not always, found in situations subject to annual burning. Populations are intermittent in the wild and usually consist of few widely dispersed individuals. Occasionally up to three tubers are produced in a connected series, possibly representing subsequent year's growths.

Aspidonepsis bears a number of similarities to the genus Aspidoglossum (Table 1), and it is the authors' opinion that the two genera may have originated from the same distant, ancestral stock. However, if this is the case, then the two taxa have since evolved along very different lines, for a number of major disjunctions in morphology now exist, such as the aggregation of inflorescences near the stem apex and the central cavities in the corona lobes of Aspidonepsis. In contrast Aspidoglossum bears inflorescences that are produced along the length of the stem and there is no corona lobe cavity.

The affinity of these two genera can be clearly seen in the corona lobe and pollinarium morphology of Aspidoglossum delagoense (Schltr.) Kupicha, which is very similar to Aspidonepsis (Figure 1). However, all other features of this species place it clearly within Aspidoglossum, of which A. biflorum E. Mey. is not only the type species but also typical of the genus as a whole (Kupicha 1984). Aspidoglossum has more species and is morphologically more diverse than Aspidonepsis.

The five species recognized in Aspidonepsis fall into two well-defined groups that require recognition at subgeneric level. The first group is characterised by spreading or ascending corolla lobes and cup- or dish-shaped corona lobes with a tooth-like appendage projecting from the floor of the corona lobe cavity. The second group has reflexed corolla lobes and corona lobes with a more angled outer margin and no tooth-like structure projecting from the floor of the corona lobe cavity.

A total of 187 pressed specimens were examined during the course of this study from the following herbaria: BOL, CPF, GRA, J, K, NBG, NH, NU, PRE, SAM and TCD*. Additional data were obtained from spirit collections and supplemented by observations in the field.

* Herbarium abbreviations are taken from Holmgren et al. (1990).

## TAXONOMY

### Aspidonepsis A. Nicholas & D.J. Goyder, gen. nov.

Aspidoglosso affinis sed sinu coroneae lobis prominenti et appendice distali coroneae lobis non filiformi nec ornata differt.

**Herba** perennis. **Caudex**: tuber globosum, fusiforme vel napiforme. **Caulis** unicus (raro duo vel tres), erectus, gracilis, usque 625 mm tantum longus. **Folia** expansa, anguste elliptica vel linearia in subgenere Aspidonepsis, sed ascendens, linearia vel nonnunquam lanceolata, margine manifeste revoluta in subgenere Unguilibio. **Inflorescentia** umbellata, terminalis subterminalis vel ad nodos disposita, 2–17-flora (in subgenere Aspidonepsis), 4–11-flora (in subgenere Unguilibio), bracteae ad anthesin persistentes. **Coronae lobi** partibus inferioribus ad columnam staminalem connatis; 0.5–1.8 mm supra corollam producti, cucullati; sinus profundus appendice linguiformi centrali ornatus in subgenere Aspidonepsis. Appendix proximalis ad apicem deltato-falcata et apicem stylii aequans vel superans impendensque; extremum distale coronae appendice parva ornatum vel appendice carente; sinus profundus rimiformis in subgenere Unguilibio. **Appendix antherae** reniformis vel pescapiformis profunde apicaliter fissa.

**TYPUS.** —Aspidonepsis diploglossa (Turcz.) A. Nicholas & D.J. Goyder, vide infra.

Perennial geophytic herb. **Rootstock** a globose, fusiform or napiform tuber. **Stems** 1 (rarely as many as three in A. flava only), erect, never more than 650 mm tall. **Leaves** spreading to ascending, linear, lanceolate to narrowly elliptic, older leaves shorter and broader; petiole

### TABLE 1. — A comparison of Aspidonepsis and Aspidoglossum

| Character                        | Aspidonepsis                      | Aspidoglossum                      |
|---------------------------------|-----------------------------------|-----------------------------------|
| **Habitat**                     | Montane only                      | Widespread                        |
| **Habit in the field**          | Erect                             | Erect buooy pendulous apically    |
| **Stem number**                 | 1, up to 3 in *A. flava*          | Usually 1 to a few, occasionally many |
| **Leaf insertion**              | Opposite                          | Opposite, or occasionally verticillate or irregular |
| **Leaf shape**                  | Usually linear, rarely lanceolate | Usually linear, rarely suborbicular, elliptic or obovate |
| **Inflorrence production**      | Near the stem apex only           | Along the length of the stem, but also gathered apically |
| **Inflorescence insertion**     | Not fasciated, rarely sessile     | Fascicled, almost sessile near stem apex |
| **Flower colour**               | Yellow, purple, and brown         | Purple and green, never yellow    |
| **Corona lobe ornamentation**   | Appendages never compound or filiform | Appendages either complicate & filiform or not ornamented |
| **Corona lobe cavity**          | Present                           | Not present, or rarely rudimentary |
| **Central corona lobe appendage** | Within the corona lobe cavity    | Present but not in the corona lobe cavity |
| **Pollinaria shape**            | Wishbone-shaped                   | Wishbone-shaped or pachyform    |
| **Pollinia shape**              | Sausage-shaped                    | Sausage-shaped or pyriform     |

* important differences between the two taxa.
FIGURE 1. — Comparison of 1, *Aspidonepsis flava*, Coleman 813, (PRE); 2, *Aspidoglossum delagoense*, Barbosa & De Lemos 7958, (K); 3, *Aspidoglossum biflorum*, Bolas 238, (K). A, flower with part of corolla removed: 1A, × 11; 2A, × 9.5; 3A, × 7. B, corona lobe, side view: 1B, × 28; 2B, × 15; 3B, × 11. C, pollinarium: 1C, × 48; 2C, × 22; 3C, × 55.

0–5 mm long. Inflorescences umbelliform; terminal, subterminal and nodal; bracts present at anthesis. Corolla catilliform or reflexed with lobe apices ascending. Corona with lower parts fused to the staminal column; lobes produced 0.5–1.8 mm above the corolla, cucullate; cavity saccate with appendage (subgenus *Aspidonepsis*) or without appendage (subgenus *Unguilobium*). Anther appendages reniform to pescapiform, with a deep apical cleft, or rectangular. Style: head swollen; apex truncated. Pollinaria wishbone-shaped; corpusculum fusiform;
translator apparatus articulated and winged; pollinia semicircular to hemiovoid or clavate. Habitat: high altitude mountain grasslands. Distribution: southern African Drakensberg. Etymology: Aspidonepsis = Aspidoglossum’s cousin. Aspid(os), (Greek for shield) but used here to indicate the genus Aspidoglossum, and anepsia (Greek for cousin).

Key to subgenera and species

1a Corolla not fully reflexed when mature. Corolla lobe cavity with a tongue-like appendage (Subgenus Aspidonepsis: 2a Proximal corona lobe appendages projecting over the style apex: A. cognata
2b Proximal corona lobe appendages not projecting over the style apex: 3a Corona lobes with arm-like proximal appendages that cross over each other and reflex back into the coronal cavity. These appendages are below the style apex and level with the anther wings .................................................. A. flava
3b Corona lobes without true proximal appendages, instead, the proximal ends are produced into dentate or obtuse (but not protruding) shoulders that are level with the style apex: .................................................. A. diploglossa
1b Corolla reflexed when mature. Corolla lobe cavity without an appendage (Subgenus Unguilobium): 4a Distal corona lobe appendages present (if somewhat short). Transkei, Natal and southern Transvaal bordering Natal Province, peaks of the Winterberg, Ecklon 23 (KW holo., photo!; PRE!, iso.).
4b Distal corona lobe appendage absent. Eastern Transvaal only .................................................. A. shebae

ENUMERATION OF THE SUBGENERA AND SPECIES

A. Subgenus Aspidonepsis

Inflorescences 2—17-flowered. Flowers yellow, green, brown and purple or these in combination. Corolla catilliform with lobe apices curving upwards or spreading, lobes with abaxial surface glabrous. Corona lobes: upper proximal margin various, distal margin obtusely rounded or truncated and raised above the proximal appendages (except A. diploglossa); cavity saccate with a centrally produced laterally flattened tongue-shaped or botuliform appendage. Anther appendages reniform or pescapiform with a deep apical cleft. Pollinia narrowing proximally; translator arms in two distinct parts, winged (Table 2).

This subgenus is composed of three species: Aspidonepsis diploglossa, A. flava and A. cognata. For a number of years these three species were considered conspecific, and lumped together under the oldest name, viz. A. diploglossa. However, although all three species are vegetatively similar, close examination shows that they are distinct entities with very different floral morphologies (Nicholas 1987). They are usually found in annually burnt or grazed, high to medium altitude, montane grasslands. They are found along the Natal-Transkei Drakensberg, and on scattered island mountain ranges in the eastern Cape and Natal midlands. The flowers of this subgenus are predominantly yellow or yellow-green, although occasionally flowers with brown or purple markings can be found.

1. Aspidonepsis diploglossa (Turcz.) A. Nicholas & D.J. Goyder, comb. nov. Type: South Africa, Cape Province, peaks of the Winterberg, Ecklon 23 (KW holo., photo!; PRE!, iso.).

Asclepias diploglossoides Schltr.: 32 (1894); Schltr.: 451 (1896); N.E. Br.: 688 (1908); Wood: 461 (1910); Philips: 194 (1917). Type: South Africa, eastern Cape, Mrs Barchard in. (K!, neo., here designated).

Asclepias schizoglossoides Schltr.: 258 (1848). Asclepias diploglossoides (Turcz.) Druce: 605 (1917).

Rootstock 1 or several tubers connected in series, 9–35 × 6–12 mm. Stems 1, erect, 170–400(–500) mm tall, bifariously pubescent. Leaves ascending to spreading, narrowly lanceolate, occasionally falcate, rarely linear or narrowly elliptic, 5–84(–130) × (0.25–)0.5—7.0 mm; apex acuminate or occasionally acute; base petiolate to cuneate; petiolate or petiole up to 4 mm long. Inflorescences 1–3 per plant, 4–16-flowered, bracts present at anthesis; peduncles up to 9.5 mm long or occasionally inflorescences apedunculate. Flowers 4–9 × 6–13 mm, yellow

| Character                                      | Aspidonepsis | Unguilobium          |
|-----------------------------------------------|--------------|----------------------|
| Stem length                                   | 170–550      | 190–625              |
| Leaf length                                   | 5–133        | 7–56                 |
| Peduncle length                               | 0–175        | 5–90                 |
| Flower colour                                 | Yellow, green, purple & brown | Yellow, purple & brown |
| * Corolla orientation                         |               |                      |
| Petal length                                  | 3.5–10.5     | 5.2–6.5              |
| * Corona lobe shape                           |              |                      |
| Proximal corona lobe appendage length         | None–1.2     | 0.4–1.3              |
| Distal corona lobe appendage length           | None         | None–0.5             |
| * Corona lobe cavity appendage length         | 0.2–1.3      | None                 |
| Alar fissure length                           | 0.5–1.4      | 0.7–1.1              |
| Anther appendage length                       | 0.3–0.6      | 0.5–1.5              |
| Style apex diameter                           | 1.1–2.8      | 1.6–2.4              |
| Translator arm length                         | 0.18–0.56    | 0.28–0.64            |
| Corpusculum length                            | 0.16–0.32    | 0.2–0.4              |
| Pollinium length                              | 0.48–0.96    | 0.68–1.0             |

* characters forming discontinuities between the two taxa.
or yellow-brown; pedicel 6–16 mm long. Calyx: lobes lanceolate, occasionally triangular or narrowly ovate, 2.5–4.6 × 1.0–1.5 mm, apex acuminate, pubescent to tomentose. Corolla: lobes ovate or occasionally elliptic, free to the base, 4–6(–7) × 2.4–4.1 mm; inside yellow, occasionally tinted with purple or lilac, outside yellow, brown or purple, these often in combination; abaxial surface with a few sericeous hairs. Corolla lobes produced ± 0.5 mm above corolla, cucullate-cyathiform, 4–6(–7) × 2.4–4.1 mm, upper proximal ends forming 2 rounded shoulders, occasionally extended into short pointed appendages, level with or projecting (slightly) onto style apex, distal end obtuse or rounded without a distinct appendage and level with or lower than style apex, saccate cavity with a tongue-like or deltoid-oblong appendage, level with or projecting (slightly) onto style apex, distal end obtuse or rounded without a distinct appendage and level with or lower than style apex, saccate cavity with a tongue-like or deltoid-oblong appendage, level with or projecting (slightly) onto style apex. Style apex 0.2–0.7 mm above upper lobe margin, colour yellow to bright yellow. Staminal column 2.0–2.8 mm long; anther appendages pescapriform or ovate and glosso- (tongue); probably in reference to the corona epithet etymology: from the Greek words diplo- (two) and glossy- (tongue); probably in reference to the corona lobe and the appendage in its central cavity. (Figure 2.1).

Aspidonepsis diploglossa is found in annually burnt montane grasslands, normally on south- or east-facing hillside slopes or mountain plateaux. Usually, but not always, occurring in wettest areas. Collectors often report it as rare, although a great many collections exist. It is usually found growing at altitudes ranging from 1 500 to 2 400 m, but occasionally also at lower altitudes. Plants flower from October to January. The tubers of this plant lie just below the soil surface, and when sectioned reveal white, woody flesh that oozes sticky, milky latex.

A. diploglossa, a mountain-loving species, exhibits a rather strange distribution. It may be found at high altitudes around Grahamstown and Hogsback in the eastern Cape, then there is a gap in the Transkei Drakensberg (which may be an artifact caused by poor collection in this area) and then it occurs abundantly along the Natal Drakensberg and its foothills as far as Van Reenen’s Pass. After yet another gap it is found again in the Wakkerstroom area. A. diploglossa may also inhabit mountain islands in the Natal midlands at places such as Inanda, Greytown and Weenen. However, it occurs in the most unlikely place near the southern Natal coast at the Umtamvuna Nature Reserve, where it grows at an altitude of only 350 m. This nature reserve is well known scientifically because it lies within the narrow belt of Natal Group sandstone in the coastal region between Port Shepstone and Port St Johns. Its rich flora includes a number of rare plants and endemic species. However, the occurrence of Aspidonepsis diploglossa at such a low altitude and so near the sea, is surprising and inexplicable (Figure 3).

Unfortunately, when R. Schlechter described Asclepias schizoglossoides in 1894 he not only failed to cite the specimens he examined, but was also unaware that he was dealing with an already described taxon. Turczaninow had named this species Gomphocarpus diploglossus in 1848, citing Ecklon 23 as the type. N.E. Brown picked up these two errors when preparing the Asclepiadaceae for Flora capensis, and in correspondence with Schlechter discovered that the latter taxonomist had based the name Asclepias schizoglossoides on a Barber specimen ‘probably collected in British Kaffiraria’. As a result, N.E. Brown (1908) suspected that the specimen may be part of Mrs Barber’s gathering numbered 35. N.E. Brown’s selection of Barber 35 as the type of the name Asclepias schizoglossoides for Flora capensis was probably correct. However, due to the destruction of Schlechter’s asclepiadaceous collections housed at Berlin herbarium during the Second World War, we cannot confirm this. In this paper we have therefore, chosen Barber 35 (K) as the neotype of the name Asclepias schizoglossoides. W.H. Harvey has written (in pencil) on two Trinity College Dublin herbarium (TCD) sheets of this species, the name Gomphocarpus luteus (var.) β heterophyllus. This name was never validly published, and must be considered nothing more than a manuscript name.

Aspidonepsis diploglossa differs from A. flava and A. cognata in possessing longer (occasionally narrower) leaves, a deeply cleft anther appendage, yellow to yellow-brown flowers and a simple cup-shaped corona lobe, the upper proximal ends of which are no more than blunt rounded shoulders level with the style apex. See Table 3.

| Location | Specimen | ID |
|----------|----------|----|
| Natal     | -2730     | NY |
| Cape      | -1386     | NH |
| Dohne Hill| -15767    | BOL |
| Transkei  | -15557    | BOL |
| Umtamvuna | -17436    | K |
| Garden    | -26054    | K |
| Cape      | -1408     | NH |
| Graham    | -5859     | K |
| Eastern   | -10059    | NH |

2. Aspidonepsis flava (N. E. Br.) A. Nichols & D.J. Goyder, comb. nov. Type: Transkei, Malowe Mountain, Tyson 1086! (K. lecto., here designated: BOL!, SAM!, isolec.)

Asclepias flava N. E. Br.: 687 (1908). Wood 460 (1910).
FIGURE 2. —1, *Aspidonepsis diploglossa*; 2, *A. flava*. A, whole plant with flowers: 1A, × 0.7; 2A, × 0.4. B, flower with part of corolla removed: IB, × 10; 2B, × 9. C, corona lobe: 1C & 2C1, side view, × 14 & × 27; 2C2, angled view to show crossed, inwardly flexed proximal appendages, × 30. D, gynostegium excluding corona: 1D, × 16; 2D, × 19. E, abaxial surface of anther: IE, × 24; 2E, × 30. F, pollinarium: IF, × 51; 2F, × 65. G, translator apparatus showing winged spur, × 89. 1A, Ruddock 136 (CPF); IB, IE, IF, Boardman All (PRE); 1C, IG, Boardman 186 (PRE); 2A–2C1, 2D–2F, Coleman 813 (PRE); 2C2, Wood 4249 (NH).
TABLE 3.—A comparison of the three species of subgenus Aspidonepsis. All measurements in mm

| Character                     | A. diploglossa | A. flava       | A. cognata       |
|-------------------------------|----------------|----------------|------------------|
| Leaf length                   | 5–33           | 7–83           | 7–68             |
| Petiole length                | 0–4            | 0–5            | 0–3              |
| Peduncle length               | 0–95           | 4–175          | 3–92             |
| Flower colour                 | Yellow purple  | Yellow, yellow & brown | Yellow-green   |
| 🆕 Petal length               | 4–7            | 3.5–5.0        | 5.8–10.5         |
| 🆗 Corona lobe shape          | Bonnet-like    | Cup-like       | Bowl-like        |
| 🆖 Corona lobe cavity depth   | 1.1–2.0        | 0.4–0.7        | 2.2–2.5          |
| 🆔 Proximal corona lobe appendage length | 0.2–0.7 | 0.4–0.7        | 0.8–1.3          |
| 🆕 Anther appendage length     | 0.75–1.1       | 0.5–0.7        | 0.8–1.4          |
| 🆗 Style apex diameter        | 1.1–2.1        | 1.1–1.6        | 1.5–2.8          |
| 🆖 Pollinium length           | 0.68–0.84      | 0.48–0.68      | 0.72–0.96        |
| 🆔 Pollinium width             | 0.24–0.36      | 0.16–0.24      | 0.24–0.32        |

# Discontinuities between A. diploglossa and the other two taxa; ● discontinuities between A. flava and the other two taxa; † discontinuities between A. cognata and the other two taxa; ‡ discontinuities between A. flava and A. cognata; * discontinuities between all three taxa.

Rootstock a globose tuber, occasionally several connected in series, 6–10 × 4–9 mm. Stems usually 1, rarely as many as 3, slender, erect, 180–475 mm long. Leaves spreading to erect, lanceolate, linear to narrow-elliptic, 7–83 × 0.5–6.0 (–7.0) mm; apex acuminate or rarely acute; base petiolate to cuneate. Inflorescences 1–3 (–6) per plant, 1–3 per stem, 4–18 (–24)–flowered; bracts present at anthesis, 2.6–5.3 (–7.5) × 0.15–0.5 mm; peduncles (4–) 10–175 mm long. Flowers 3–5 (–6) × 5–8 mm; pedicel 5–11 mm long. Calyx: lobes lanceolate, 2.0–3.6 (–4.0) × 0.7–1.2 mm. Corolla: lobes ovate, occasionally elliptic, free to the base, 3.5–5.0 × 2.0–3.2 mm, inside greenish yellow or yellow, outside yellowish green, pale yellow or yellow with a purple apex, margins occasionally slightly revolute. Corona lobes produced 0.5–0.8 mm above corolla, cucullate-crateriform, in side view boxing glove-shaped, 1.0–1.6 mm long, upper proximal ends extending into 2 short (0.25–0.70 mm), subulate or arm-like appendages that meet and are then reflected back to point to distal end of lobe, lower than style apex, distal end dilated and bowl-shaped with upper margin overtopping the style apex (even if only slightly); cavity crateriform, 0.4–0.7 mm deep with a central sausage-shaped appendage projecting 0.4–0.7 mm above cavity margin; orange-yellow, golden yellow, yellow-green or yellow. Staminal column 1.0–1.5 mm long; anther wings shallowly concave in upper two thirds, rounded in lower third, truncate basally, 0.5–0.7 × 0.2–0.45 mm; anther appendages reniform, membranous, (0.2–) 0.3–0.4 (–0.5) × 0.5–0.8 mm, decumbent on sides and top of style apex. Style apex truncate, margin undulate, apex concave with a small central pore, 1.1–1.6 mm wide. Pollinaria: corpusculum 0.16–0.20 (–0.26) × 0.60–0.08–0.10 mm; translator arms (0.20–) 0.18–0.28 mm long; pollinia dilated distally, narrowing proximally, (0.48–) 0.52–0.64 (–0.68) × 0.16–0.24 mm. Fruits: mature follicles not seen, immature pollinaria narrowly fusiform with an attenuate apex, not echinate. Seeds not seen. Specific epithet etymology: from the Latin word flavus meaning pale yellow. This is in reference to the pale yellow flowers of this species. (Figure 2.2).

Aspidonepsis flava is usually found growing in annually burnt montane grasslands. Colonies are usually scattered and occur at altitudes between 600 and 2 000 m, rarely at altitudes as low as 450 m. Distributed from Grahamstown in the eastern Cape through Transkei to Natal. The species is commonly found in the Drakensberg or its foothills, although it can be found in the midland and coastal belts if mountainous areas provide it with a suitable refuge (Figure 4). A. flava flowers in the midsummer months between November and January, although there is one record of a plant flowering in October.

This taxon was first described by N.E. Brown in Flora capensis (1908), and is abundant in southern Natal and the Transkei interior. The limits of its southern distribution is near Grahamstown where a few specimens have been collected. Plants grow in small colonies in annually burnt grasslands, and usually occur on hillside slopes amongst scattered rocks where they receive some protection from grazing animals and fire. Plants may have up to three tubers connected in series, each probably representing a previous year’s growth. Like A. diploglossa.
these globose tubers are found just below the soil surface, and have white, latex-filled flesh.

A. flavia is distinguished from the other two species in subgenus *Aspidonepsis* by its longer peduncles, smaller, paler coloured flowers, smaller pollinarium, bowl-shaped corona lobes with arm-like proximal appendages that cross one another and are then reflexed into the corona lobe cavity and the sausage-shaped appendage projecting from the floor of the corona lobe cavity. Table 3.

NATAL. —2929 (Underberg). Cobham State Forest, (-CB), Cowan 124 (NU); near Underberg, (-CD), Dyer 3744 (K, NH); Mahawuca Mt area, (-DA), Rennie 275 (NU); Mpendle, (-DB), Huntley 625 (NH); Nkonzo State Forest, (-DD), Nicholas & Norris 1059 (CPF, NH, PRE); 2930 (Pietermaritzburg). Howick, (-AC), Huaton 408 (BM, K, PRE); Benvie, Karkloof, (-AD), Hilliard & Burst 1349 (NU), Winterskloof, (-CB), Sim s.n. (PRE); near Byrne Village, (-CC), Stewart 2023 (K, NU); Weza State Forest, (-DA), Nicholas 2080 (NH); Fort Donald, (-DC), Tyson 1660 (SAM). 3030 (Port Shepstone): Ixopo, (-AA), Shirley s.n. (NU).

TRANSKEI. —3028 (Matatiele): near Eland's Height, (-CD), Stewart 1908 (NU); 3029 (Kokstad): near Mt Curren, (-AD), Hutchinson 1823 (K), Tyson 1666 (BOL, PRE, SAM); Ensikeni, (-BA), Haygarth s.n. ex Wood 12049 (NH 18644, SAM); Malowe, (-BD), Tyson 2723 (K, SAM); Vaal Bank, (-CB), Haygarth s.n. ex Wood 4230 (K, NH). 3127 (Lady Frere): Mount Kwenke, (-DA), Bolus 10215 (BOL), Engcobo, (-DB), Bolus 10216 (BOL). 3128 (Umtata): Mphalane, (-BC), Hutchings 1387 (KEI); Bazija, (-CB), Baur 556 (K, SAM).

CAPE. —3326 (Grahamstown): Grahamstown, (-BC), Glass 1503 (K, NBG).

WITHOUT PRECISE LOCALITY. — Natal (Liddesdale), Wood 4249 (K, NH); Gerrard 1315 (BM, K).

3. *Aspidonepsis cognata* (N.E. Br.) A. Nicholas & D.J. Goyer, comb. nov. Type: Transkei, Mount Insizwa, Schlechter 6496 (K!, holotype; BOL!, NH!, PRE!, isotype).

*Asclepias cognata* N.E. Br. 687 (1908).

_3. Aspidonepsis cognata_ (N.E. Br.) A. Nicholas & D.J. Goyer, comb. nov. Type: Transkei, Mount Insizwa, Schlechter 6496 (K!, holotype; BOL!, NH!, PRE!, isotype).

Asclepias cognata N.E. Br. 687 (1908).

**Rootstock** a tuber, 7 ≤ 7 mm. **Stems** 1, erect, 180–550 mm tall. **Leaves** spreading to ascending, linear, occasionally lanceolate, 7–11 × 0.3–0.7 × 4.0–6.0 mm; apex acuminate, base shortly petiolate, occasionally cuneate. **Inflorescences** occasionally subtended by leaves, 1–2 per plant, 1–7(–9)-flowered; bracts not fagineous, grading with leaves; peduncles 3–7(–9) mm long. **Flowers** 5–12 × 7–17 mm; pedicels 6–12-mm long. 

**Calyx:** lobes lanceolate, 3.0–5.0 × 1.0–1.8 mm, apex acuminate. **Corolla** glabrous; lobes elliptic, occasionally narrow-elliptic to ovate, (5.8–)7.6–10.5 × 2.6–5.8 mm, apex acute, inside yellow, yellow-purple, brown-purple, yellow and lilac, outside pale greenish yellow sometimes suffused purple, or mustard yellow, or greenish brown, or base yellow and apex purple, or base mauve and apex yellow to dark brown, or yellow-brown with purple veins. **Corona lobes** produced 1.5–1.8 mm above corolla, culate, bonnet-shaped, 3.0–4.8(–5.3) [oblique measurement] × 1.3–2.5 mm, upper proximal ends extended into 2 short (0.6–)0.8–1.2 mm, subulate or arm-like appendages sometimes projecting over style apex, dilated distal end overtopping style apex by 0.6–10 mm and truncated along its upper margin; cavity 0.8–1.3 mm deep with a yellow tongue-like central appendage projecting 0.8–1.3 mm above lip of corona lobe (i.e. almost level with the upper margin of the distal end); colour dull yellow-green, mustard yellow, or yellow and purple, with red or brown along the margin. **Staminal column** 1.5–2.6 mm long; anther wings 0.8–1.4 × 0.4–0.6 mm; anther appendages reniform, membranous, 0.3–0.9 × 1.3–3.0 mm, decumbent on the sides of the style head. **Style apex** truncate with thickened undulate margins, concave with a small pore in the centre, 1.5–2.8 mm wide. **Pollinaria:** corpusculum 0.3–0.3 × 0.1–0.12 mm; translator arms 0.32–0.56 mm long; pollinia semi-circular to semi-ovate with a short narrow proximal end, 0.72–0.96 × 0.24–0.32 mm. **Fruits:** mature follicles not seen, young follicles tomentose (but not echinate). **Seeds** not seen. **Specific epithet etymology:** from the Latin word *cognatus* meaning related. Unfortunately, N.E. Brown did not explain the sense in which he applied this name. (Figure 5).

*Aspidonepsis cognata* may be found scattered in annually burnt (but not always) montane grassland, usually occurring in river valleys or near streams where the soil is quite damp. This graceful species flowers between November and December (although there is one record for October), and occurs at altitudes between 1 200 and 2 100 m, rarely lower. *A. cognata* is confined to a small area in the southern Natal and northern Transkei Drakensberg (Figure 6).

It is unfortunate that N.E. Brown (1908) chose Schlechter 6469 as the type of *Asclepias cognata*, because this collection is not typical of the species as a whole. However, all specimens of Schlechter 6469 examined, although not typical, clearly belong to this species. In appearance Hilliard & Burst 7855 is more representative of the species. 

*Aspidonepsis cognata* can be distinguished from the other species in subgenus *Aspidonepsis* by its larger flowers, larger corona lobes which are broadly helmet-shaped, wider anther appendages and its longer translator arms and pollinia. (See Table 3). The corona lobe shape is highly diagnostic, in particular the subulate or arm-like proximal appendages which may project over the style apex, and the raised distal end which is usually truncated along its upper margin and overtops the style head.

NATAL. —2929 (Underberg). Fort Nottingham Commonage, (-BD), Wright 2241 (NU); Gxalingenwa Valley, (-CB), Hilliard & Burst 17060 (K, PRE), Garden Castle State Forest, (-CC), Hilliard & Burst 17567 (K, NU); Umzimkulu headwaters, (-CD), Hilliard & Burst 7855 (K, NU); Mpendle, (-DB), Tyson 1660 (SAM).

TRANSKEI. —3029 (Kokstad): Ensikeni, (-BA), Haygarth s.n. ex Wood 12045 (K, NH 13661); Mount Insizwa, (-CD), Schlechter 6496.
B. Subgenus Unguilobium

Unguilobium A. Nicholas & D.J. Goyder, subgen. nov.

Folia ascendenteria, margine manifeste revoluta. Inflorescentia 4–11-flora. Corolla reflexa; pagina abaxialis pubescentia. Coronae lobi ad columnam staminalem circa 1 mm super insertionem corollae conjuncti, cucullati; appendix proximalis ad apicem delto-falcata et apicem styli aequans vel superans impendensque; extremum distale coronae appendice parva omatum (A. reenensis) vel appendice carente (A. shebae); sinus profundus rimiformis.

TYPUS.—Aspidonepsis reenensis (N.E. Br.) A. Nicholas & D.J. Goyder vide infra.

Stems 1, erect, thin, up to 625 mm tall. Leaves ascending, linear, occasionally lanceolate, older leaves shorter and broader, margins noticeably revolute. Inflorescences 4–11-flowered, bracts present at anthesis and grading in size and shape with leaf system. Flowers purple, brown, lilac and yellow. Corolla reflexed, lobe apices ascending, abaxial surface pubescent. Corona produced high on staminal column, ± 1 mm above corolla; lobes with proximal appendages deltoid-falcate with obtuse apex level with or projecting over style apex, distal end of corona with arm-like appendage reflexed into corona lobe cavity (A. reenensis) or without appendage (A. shebae). Staminal column: anther wings ear-like in outline; anther appendages pescapriform, deeply cleft at apex (A. shebae), or ovate to rectangular and occasionally cleft at apex (A. reenensis). Style apex with slightly thickened, undulate margins. Pollinia: distal end noticeably dilated and narrowed towards proximal end. Etymology: from the Latin words ungu(is) (claw) and lob(us) lobe, in reference to the claw-shaped corona lobes of this subgenus (Table 2).

There are two species in subgenus Unguilobium, viz. A. reenensis (the type species) and A. shebae. Both are
confined to mountainous areas of the southern African Drakensberg. *A. reenensis* is found in the southern regions of this mountain system (namely Natal), whereas *A. shebae* is found in the northeastern region (the eastern Transvaal). As such, these species are quite widely separated geographically (Figure 6). Although probably related (even if somewhat distantly), they can be easily told apart using corolla lobe and anther appendage shape.

4. *Aspidonepsis reenensis* (N.E. Br.) A. Nicholas & D.J. Goyder, comb. nov. Type: South Africa, Natal, Van Reenen, *Wood 8635* (K! holo.; GRA!, NH!, PRE!, SAM!, iso.).

_rootstock_ a tuber, 17—25(—41) × 7—14 mm. _Stems_ 1, erect, 240—520(—625) mm long, scabrous. _Leaves_ linear, 10.0—56.0 × 0.7—2.5(—4.0) mm, apex acuminate, base cuneate; usually apetiolate or petiole up to 1 mm long. _Inflorescences_ occasionally a number massed towards the stem apex, 1—3(—4) per plant, (1—)4—8-flowered; _bracts_ 2.50—5.90 × 0.25—0.50 mm; _peduncles_ (9—)12—65(—75) mm long. _Flowers_ (4—)5—7 × 7—11 mm; _pedicel_ 9—15(—21) mm long. _Calyx_ reflexed, lobes lanceolate, apex acuminate, 2.7—4.5 × 1.0—1.7(—2.5) mm. _Corolla_: lobes narrow-elliptic to ovate, 5.5—6.5 × 2.5—3.8 mm, colour (inside and out) dark reddish brown, dark brown, brown, dull reddish purple or purple, margins light yellow or

FIGURE 6.—Distribution of *Aspidonepsis cognata*, △; *A. reenensis*, ○; and *A. shebae*, ▲.
purple to white, abaxial surface puberulent to villous, especially in centre and towards the base. Corona lobes produced from staminal column 0.8–1.0 mm above corolla, cucullate, almost cyathiform, (1.6–)2.2–2.6 × 1.3–1.8 mm; upper proximal ends forming 2 short, falcate, arm-like appendages with rounded or broad and frilly apices, (0.4–)0.7–1.3 × 0.4–1.0 mm, projecting over or (at least) raised above the style apex; distal appendage short (+ 0.5 mm), broad and arm-like, reflected into the cavity (sometimes totally hidden by sides of lobe), appendage below style apex and almost level with corpusculum. Staminal column ± 3 mm tall, slightly inflated in lower portion below each corona lobe; anther wings shaped like an elongated ear lobe, 0.8–1.1 × (0.3–)0.4–0.5 mm; anther appendages ovate to rectangular, appearing wrinkled, white, membranous, occasionally cleft at apex, 0.8–1.5 × 1.0–1.3 mm, decumbent on style apex. Style apex truncate, concave with a small central pore, ±0.5 x ±0.7 mm, decumbent on style apex. Fruits not seen. Specific epithet etymology: a latinization of Reenen from Van Reenen’s Pass, the type locality of this species (Figure 7).

A. reenensis grows in dry mountain grasslands, often in sandy situations on top of the Cave Sandstone zone of the Little Berg. It also occurs in Themeda triandra veld, which is indicative of a fire climax community (Killick 1963). This species, said by collectors to be frequent to rare, is found in the Natal Drakensberg, from Bushman’s Nek in the south to Van Reenen’s Pass in the north (Figure 6). It occurs at altitudes varying from 1 500 to 2 100 m, and flowers in the midsummer months, December and January, with one record from November.

Corona lobe structure in the tribe Asclepiadaceae is very species-specific and usually uniform within a species (Nicholas 1987). There are however certain exceptions, A. reenensis being one of them. The corona lobe structure of this species is extremely variable, although one can still see an underlying, and therefore unifying, corona lobe pattern (Figure 8).

5. Aspidonepsis shebae A. Nicholas & D.J. Goyder, sp. nov., A. reenensis (N.E. Br.) A. Nicholas & D.J. Goyder affinis sed coronae lobis unguiformibus nec cyathiformibus, appendice proximali brevi falcataque nec rotundata vel fimbriata, appendice distali brachiformi carente differt.

TYPE.—Transvaal, 2430 (Pilgrims Rest): (-DC), Mt Sheba Nature Reserve, Forrest & Gooyer 216 (PRE!, holo.).

Rootstock a tuber, ± 15 × ± 7 mm. Stems 1 erect, 190–340 mm long. Leaves linear or occasionally lanceolate, 7–44 × 1–4 mm, older leaves smaller and broader, apex acuminate; usually apetiolate, rarely with petiole up to 0.5 mm long. Inflorescence 1–2 per plant, (2–)4–8-flowered; peduncle (5–)19–90 mm long. Flowers 4.0–6.5 × 6.0–8.0 mm; pedicel 10–15 mm long. Calyx: lobes lanceolate, 3.4–3.6 × 1.1–1.3 mm. Corolla: lobes ovate or rarely elliptic, 5.1–5.8 × 3.0–3.6 mm; inside: base pale yellow with a lilac apex, or base lilac with a dark purple apex; outside: base green-yellow with a purple or dark purple apex; margins pale yellow to white; abaxial surface pubescent. Corona lobes produced from staminal column ± 1 mm above corolla, claw-like (unguiform), 1.8–3.0 × 2.0–2.1 mm; upper proximal ends extended into 2 short, falcate, subulate appendages projecting over style apex; distal end a square, blunt shoulder which is ± level with style apex; cavity a shallow, central channel ± 0.9 mm deep; yellow in dried specimens. Staminal column ±2.5 mm tall; anther wings ear-shaped, ±0.7 x ±0.4–0.45 mm; anther appendages pescaprirform, deeply cleft at apex, membranous, ±0.5 × ±0.7 mm, decumbent on style apex. Gynoecium: style apex truncate, concave with a small central pore, 1.6–1.8 mm wide; ovaries noticeably pubescent. Pollinarium: corpusculum 0.20–0.26 × 0.10–0.12 mm; translator arms 0.28–0.40 mm long; pollinia...
clavate, 0.68—0.76 × 0.32—0.36 mm. Fruits and seeds not seen. Specific epithet etymology: a latinization of Sheba from Mt Sheba, the type locality. (Figure 9).

_A. shebae_ probably occurs in montane grasslands, and is restricted to high altitude areas (1 400 to 2 100 m) of the Pilgrim's Rest region of the eastern Transvaal (Figure 6). Plants flower in December-January, and according to one set of collections is said to be frequent.

Vegetatively _A. shebae_ is very similar to _A. reenensis_, and it is probably closely related to this species (Table 4). In floral morphology, however, these two species differ greatly, especially in corona lobe structure (Figure 10).

**FIGURE 9.** —_Aspidonepsis shebae_. A, whole plant with flowers, × 0.5; B, flower with part of corolla removed, × 7.5; C, corona lobe, side view, × 14; D, gynostegium excluding corona, × 11; E, abaxial surface of anther, × 24; F, pollinarium, × 53. A, B, D—F, Smuts & Gillett 2326 (PRE); C, Forrester & Gooyer 216 (PRE).

**TRANSVAAL.**—2430 (Pilgrim's Rest): Mt Sheba Nature Reserve, (−DC), Forrester & Gooyer 216 (PRE); Mauchsberg, (−DC), Smuts & Gillett 2326 (PRE). 2530 (Lydenburg): Mount Anderson, (−BA), Smuts & Gillett 2370 (PRE).

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TABLE 4.—A comparison of the two species in subgenus Unguilobium. All measurements in mm

| Character                                      | A. reenensis | A. shebae                |
|-----------------------------------------------|--------------|--------------------------|
| Stem length                                   | 24.0–62.5    | 19–34                    |
| Leaf length                                   | 10–56        | 7–44                     |
| Peduncle length                               | 9–79         | 5–90                     |
| Flower colour                                 | Brown & purple | Brown, purple & yellow  |
| Petal length                                  | 5.5–6.5      | 5.2–5.8                  |
| Proximal corona lobe appendage length         | 1.3–1.8      | 2.0–2.1                  |
| Distal corona lobe appendage length           | ± 0.5        | ± 0.5                    |
| Alar fissure length                           | 0.8–1.1      | ± 0.7                    |
| Anther appendage length                       | 0.8–1.5      | ± 0.5                    |
| Style apex diameter                           | 1.0–1.3      | ± 0.7                    |
| Corona lobe width                             | 1.8–2.4      | 1.6–1.8                  |
| Distal corona lobe appendage length           | 0.44–0.64    | 0.28–0.4                 |
| Translator arm length                         | 0.28–0.4     | 0.2–0.26                 |
| Corpusculum length                            | 0.84–1.0     | 0.68–0.76                |
| Pollinium length                              | 0.22–0.28    | 0.32–0.36                |

* characters forming discontinuities between the two taxa.

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FIGURE 10.—Corona lobe variation in Aspidonepsis shebae. A, forrester & Gooyer 216 (PRE), × 16; B, Smuts & Gillett 2326 (PRE), × 15; C, Smuts & Gillett 2326 (PRE), × 15; D, Smuts & Gillett 2370 (PRE), × 18.5.

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