

The identity of *Eriosema nanum*

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ABSTRACT

An examination of available evidence leads to the conclusion that *Eriosema nanum* Burt Davy must be regarded as a synonym of *E. ellipticifolium* Schinz. The relationship between *E. ellipticifolium* and *E. uniflorum* Burt Davy is discussed.

RESUME

L'IDENTITE D'ERIOSEMA NANUM

Eriosema nanum Burt Davy doit être considéré comme un synonyme d'*E. ellipticifolium* Schinz. A cette conclusion basée sur l'examen des preuves disponibles est jointe une discussion de la relation entre *E. ellipticifolium* et *E. uniflorum* Burt Davy.

INTRODUCTION

Eriosema nanum Burt Davy, together with *E. populifolium* Harv. and *E. angustifolium* Harv., are among the rarest of the Fabaceae in South Africa. Recent intensive field studies of *Eriosema* (Stirton, 1975) showed the widespread occurrence of hybridization and of morphological variation in the genus in South Africa. This paper assesses various aspects of phenotypic plasticity and interspecific hybridization as they affect the identity and delimitation of *E. nanum*.

HISTORY

Schinz, in Vjschr. Naturf. Ges. Zürich 66: 229, 1921, based *E. ellipticifolium* on *Junod* 1411 from Shilouvane and *Junod* 2534 (Fig. 1) from Marovunge, both in the Eastern Transvaal. Owing to the absence of ripe or almost ripe fruits, he was unable to establish clearly whether he was dealing with a *Rhynchosia* or an *Eriosema* species ("Solange keine reifen oder nahezu reifen Früchte vorliegen, ist es vorläufig ein aussichtsloses Bemühen, feststellen zu wollen, ob es sich um eine *Rhynchosia*—oder eine *Eriosema*-Art handelt, sicher ist, dass sie sich mit keiner der mir bekannten Arten dieser oder jener Gattung deckt"). He commented, however, that the plant was reminiscent of *E. salignum*, but differed

in its lower surface indumentum. The name *E. ellipticifolium* has never been taken up.

In 1932 Burt Davy treated *E. ellipticifolium* very briefly under the heading "species not seen". In this work, however, he published *Eriosema nanum* based on *Galpin* 1139 from the summit of the Saddleback Mountain in the Barberton area (Fig. 2). As its allies he noted *E. rufescens* Schinz and *E. burkei* Benth. and commented also that it was perhaps closest to *E. uniflorum* Burt Davy.

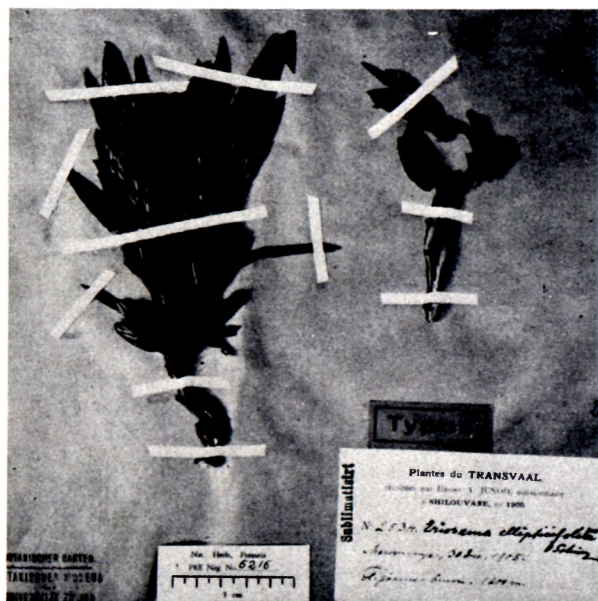


FIG. 1.—*Junod* 2534, lectotype of *Eriosema ellipticifolium*.



FIG. 2.—*Galpin* 1139, isotype of *Eriosema nanum*.

A study of type specimens leaves no doubt that *E. nanum* is synonymous with *E. ellipticifolium*. Population studies showed that the wide leaf variation encountered is the result of a cline of decreasing width in a northerly direction (Stirton, 1975). The type localities of *E. ellipticifolium* occur in the northern extremities of this range. It is unfortunate that the more descriptive name *nanum* must be superseded.

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FIELD OBSERVATIONS

Plants growing in full sun tended to be shorter and more compact than plants of the same species found growing under different intensities of shade. In Fig. 3 plants of *E. ellipticifolium* that were found growing in short open grassland (plant 1) are contrasted with those growing along a road bank in a pine forest (plant 2). Plant 1 can be seen to be smaller and more compact than plant 2. Other obvious differences, not all observable from the photographs, are the longer inflorescences, the thinner leaves and the less prominent secondary and tertiary venation in plant 2. Plants that grew through a thick canopy of grass had the same facies as the plants that grew in or along forest margins. These features can be clearly seen on *Stirton* 1431. These various expressions of morphological form could possibly be the result of a competition balance of mineral nutrients, degree of light intensity, extent of water availability, or a combination of these and other factors. The plants shown in Fig. 3 were chosen as representative of the range of variation within the species after a critical inspection of their populations.



FIG. 3—*Eriosema ellipticifolium*. The different facies of plants growing: 1, in short open grassland (*Stirton* 1467); 2, on a roadbank in a pine forest (*Stirton* 1486); 3, in burnt veld (*Stirton* 1040); 4, in unburnt veld adjacent to 3 (*Stirton* 1041).

Plants that grew in burnt veld (Fig. 3: 3) had a more stunted form than plants of the same species which grew in adjacent unburnt veld (Fig. 3: 4). These plants were collected on the same day. The various populations were observed subsequently and it was found that once the new grass had come away the "dwarf plants" began to grow lank so that by the end of the season they were similar, but still shorter, than plants collected in the adjacent tall unburnt grassveld. The plants that grew in the burnt veld had almost completed their flowering period by the time the plants which grew in the unburnt veld had begun to flower.

The observations in open veld and in forest, and in burnt and unburnt veld, were found to be consistent throughout the range of distribution of *E. ellipticifolium*. The results lead me to suspect that once the type specimen of *E. uniflorum* Burt Davy is compared, it will probably have a facies similar to plant 2 in Fig. 3 and hence synonymous with *E. ellipticifolium*. Compton (1974, pers. comm.) has indicated that he intends to incorporate *E. uniflorum* under *E. nanum* in his revised Flora of Swaziland. Judgement is here reserved until the type is traced, since the description

of *E. uniflorum* has features linking *E. ellipticifolium* and *Stirton* 1482 (*E. sp. nov.*) allied to *E. cordatum*. On the *Galpin* 1139 sheet from the Bolus Herbarium there is a specimen *Bolus* 11854 that has three Bolus manuscript names; *uniflorum*, *pumilum* and *cryptantha*. Appended to the specimen is a note, apparently in N. E. Brown's handwriting, that says "We afterwards decided that this was probably a stunted form of *E. burkei*". The specimen is *E. ellipticifolium*. Field studies (*Stirton*, 1975), however, indicated that stunted forms of *E. pauciflorum* Klotzsch, rather than *E. burkei*, are deceptively similar to *E. ellipticifolium*.

The most noticeable variation observed in the field was the range in number of flowers per inflorescence. Plants of the same population were found to have inflorescences bearing from one to ten flowers.

Although most specimens have been reasonably easy to place in this species there remain a few problems. Hybridization cannot be ruled out as the cause of some complexing difficulties encountered in a recent field trip. Two populations in particular require a detailed study as in both areas *E. ellipticifolium* grows sympatrically with the rare *E. angustifolium* Burt Davy and an undescribed taxon. A feature of these populations is their marked geographical separation viz. Magoebaskloof (N. Transvaal) and Havelock (Swaziland) and also the wide range of "intermedates" found. Flower colour, pubescence and the shape of stipules have been shown in preliminary hybridization studies (*Stirton*, 1975) on other species to be reliable indicators of putative hybrids. These three characters varied markedly in "intermediate" plants in both populations. *E. angustifolium* has a striking, stiff, rufous, patent indumentum, linear leaves, erect habit, and yellow flowers, and is not readily confused with either *E. ellipticifolium* or *Stirton* 1445 (*E. sp.*) The latter occurs from the N. Transvaal southwards to Swaziland and although fairly common in isolated areas has not been previously collected. This multi-stemmed plant is a pink and yellow flowered perennial with prostrate habit, and small unifoliate leaves. Its closest affinity is *E. ellipticifolium*. The intermediate plants at Magoebaskloof seem to be hybrids between *E. angustifolium* and *E. ellipticifolium* (*Stirton* 1442), and between *Stirton* 1445 (*E. sp.*) and *E. ellipticifolium* (*Stirton* 1446). Further field studies are necessary before all three putative parents are clearly delimited. The inter-relationships of these three species remain obscure.

Three specimens named *E. ellipticifolium* in this study are doubtful: these are *Jacobsen* 1587, *Coetzer* 150, and *Vahrmeijer* 2433. The last two of these, although very close to *E. ellipticifolium*, differ in pubescence and their very acute leaves. All these will no doubt be easier to place once all the montane species of *Eriosema* have been studied.

E. ellipticifolium begins flowering in early September and reaches a peak in December, occasionally extending into January. The Natal populations flower much earlier than those in the Transvaal.

TAXONOMY

Eriosema ellipticifolium Schinz in Vjschr. Naturf. Ges. Zürich 66: 229 (1921). Syntypes: Transvaal, Shilouvane, near Sanatorium, *Junod* 1411 (Z!); Marouvunge, *Junod* 2534 (Z!). Lectotype: *Junod* 2534 (Z!).

Eriosema nanum Burt Davy, Fl. Transv., 2: XXII (1932); Ross, Fl. Natal 208 (1972). Type: Transvaal, Saddleback Mountain, *Galpin* 1139 (PRE, holo.); BOL, NBG, NH).

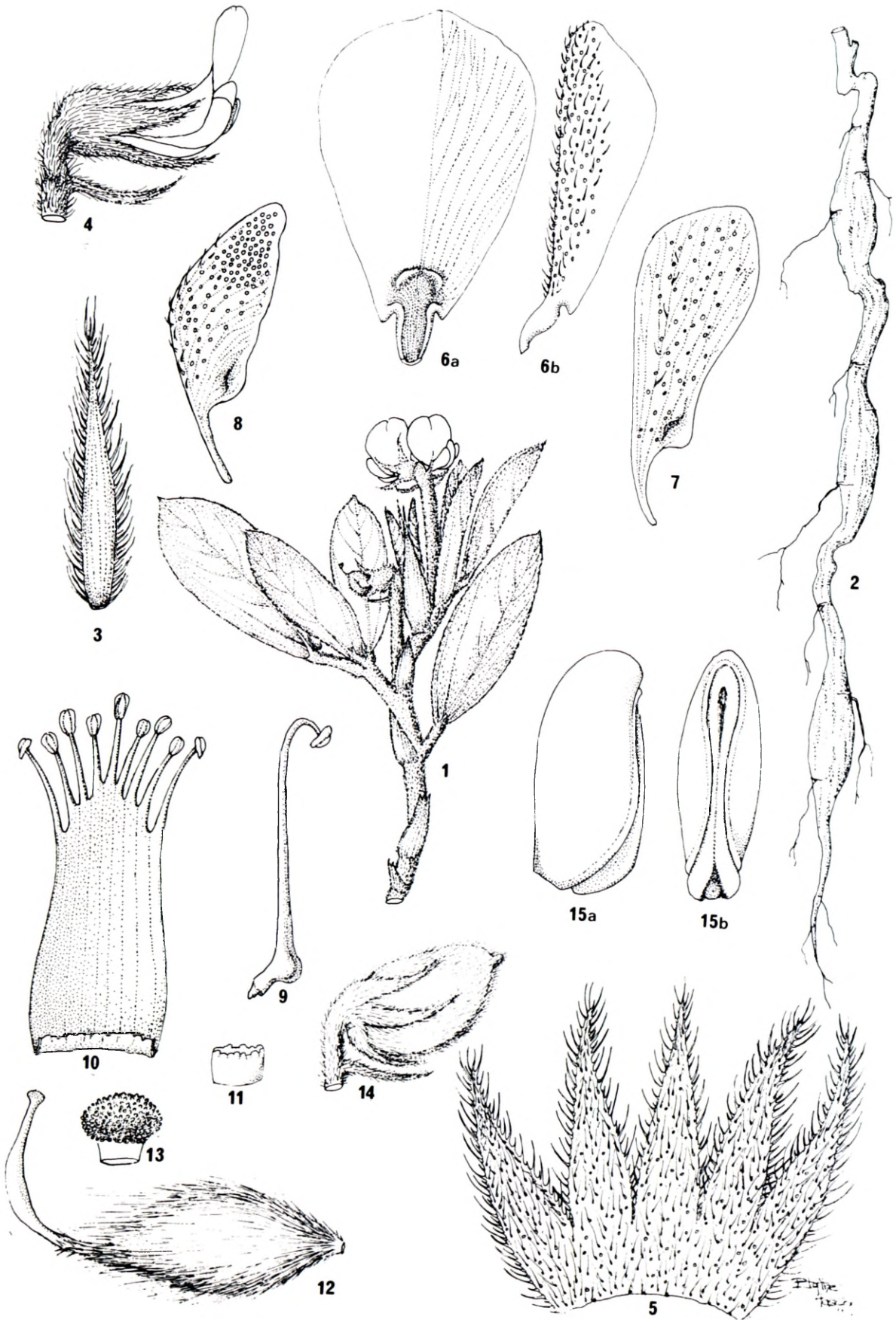


FIG. 4.—*Eriosema ellipticifolium*. 1, habit, 1; 2, perennial rootstock, x 1; 3, flower bract, x $7\frac{1}{2}$; 4, flower, x $2\frac{1}{2}$; 5 calyx opened out, x $7\frac{1}{2}$; 6a, standard opened out x $5\frac{1}{2}$; 6b, standard closed, x $5\frac{1}{2}$; 7, wing, x $5\frac{1}{2}$; 8, keel, x $5\frac{1}{2}$; 9, vexillar stamen, x $7\frac{1}{2}$; 10, staminal sheath, x $7\frac{1}{2}$; 11, discoid floral nectary, x 15; 12, gynoeceum, x $7\frac{1}{2}$; 13, stigma, x 33; 14, fruit pod, x 1; 15a, seed with strophiole, face view, x $5\frac{1}{2}$; 15b, seed with strophiole, marginal view showing hilum, x $5\frac{1}{2}$.

Perennial herb (4) 9–12 (25) cm high with one to six stems from short stylopodium of carrot-like, usually constricted, underground rootstock. *Stems* erect or ascending, 3–10 (23) cm long; terete or angular, often ribbed, glandular or eglandular, clothed with short white pubescent and long spreading pale yellow or white, hairs. *Stipules* free, 6–15 mm long, 2,0–3,5 mm wide; narrowly ovate to ovate, often falcate, striate, white or ferruginous hairy. *Leaves* trifoliolate, basal leaves unifoliolate; leaflets 4,0–7,0 cm long, 1,4–3,5 cm wide, laterals smaller, elliptic to narrowly elliptic or narrowly oblong, base truncate, mucronate, middle nerve slightly sunken above, prominent and subreticulate below, short appressed pubescent on both sides, denser on nerves, densely orange gland-dotted below, lightly above, terminal leaflet symmetrical, laterals asymmetrical with bases slightly oblique; young leaves glandular, long appressed tawny haired on veins with short curly dense pubescence between; *Petiole* 4–11 mm long; *Petiolules* ca. 2 mm long; rachis 5–8 mm long. *Racemes* 1–10-flowered; peduncle (1,0) 2,0–3,5 (7,5) cm long, canaliculate, with long spreading tawny, or long white hairs interspersed with short white deflexed hairs; rachis 0,7–2,1 cm long; pedicels ca. 3 mm long. *Flowers* 6–10 (13) mm long, 3–5 mm wide, reflexed, corolla barely exceeding calyx, yellow; *bracts* 6–8 mm long, 1,0–1,5 mm wide, lanceolate, shallow boat-shaped, 3–6-veined, thinly pilose, more than half length of flower. *Calyx* 6–9 mm long with long and short admixed pale yellow or white hairs, glandular outside, hairy inside at apex of lobes with smaller hairs scattered on either side of veins; tube 2,0–2,5 mm long, slightly longer between horn lobes; lobes unequal, lanceolate, 3–4 times longer than tube, horn lobes 7,5–8,0 mm long curving inwards, lateral lobes 7,0–8,0 mm long curving upwards; keel lobe longest, 8,0–9,2 mm long. *Standard* yellow (7,5) 9–10 (13,0) mm long, (4,5) 6,0–7,0 mm wide, narrowly obovate, often narrowed towards base, white pubescent and glandular on back; claw 2,0–2,6 mm long; width between auricles 3,0–4,0 mm; appendages free of auricles, being upcurled flaps joined slightly in the middle, (1,5) 3,5–4,0 mm from base of claw. *Wings* 7,5–10,1 mm long, 2,0–3,3 mm wide at maximum, longer than keel blades, eglandular, occasionally very glandular; claw 1,5–2,5 mm long, attenuate; auricle (1,2) 1,5–1,6 mm high, straight. *Keel blades* 6,5–7,5 (8,9) mm long, 3,0–4,0 (4,6) mm wide at maximum, auricle 1,0–1,7 (2,0) mm high, claw 1,7–3,0 mm long, attenuate, apex rostrate. *Staminal sheath* 5,7–7,0 mm long, 2,7–4,0 mm wide at maximum, free stamen 5,0–6,0 mm long, basal knee 1,0–1,3 mm long. *Gynoecium* 6,0–6,6 mm long; ovary 2,4–3,0 mm long, subsessile; clothed with long stiff hairs as far as point of style swelling or flexure; gynophore 0,1–0,5 mm; style unevenly thickened, widest at middle of thickening, curvature 2,0–2,2 (2,7) mm high; stigma globose, inserted. *Nectary* 0,4–0,5 mm high, discoid, margin erose. *Fruits* broadly ovate, 1,4–1,6 cm long, 0,9–1,0 cm wide, clothed with appressed light yellow hairs, denser along sutures, with small stiff hairs between; seeds 0,5–0,6 cm long, 0,3 cm wide, black, or greenish yellow with small faint reddish blotches. (Fig. 4).

Eriosema ellipticifolium is restricted to isolated mountain "islands" in Swaziland, the Transvaal and Natal (Fig. 5). This species exhibits a disjunct distribution over a wide area and over diverging ecological conditions and veld types. It is found between 1 600–2 500 m growing predominantly amongst rocks in short grassland on dry ridges with a northwest

aspect. A number of populations has been located on forest margins and along forest roads at the Witklip, Mariepskop and Woodbush Forest Reserves.

SWAZILAND.—2631 (Mbabane): Mbabane (–AC), *Rogers 11601* (PRE).

TRANSVAAL.—2329 (Pietersburg): Haenertsburg (–DD), *Pott 4798* (PRE). 2330 (Tzaneen): Magoebaskloof Hotel (–CC), *Stirton 1443* (PRE). 2429 (Zebediela): Donkerkloof near Chunespoort (–BA), *Vahrmeijer 2443* (PRE). 2430 (Pilgrim's Rest): The Downs (–AA), *Rogers 22057* (PRE); near Reitz's grave on Mariepskop (–DB), *Stirton 1449* (PRE); Ohrigstad Nature Reserve (–DC), *Jacobsen 1587* (PRE). 2530 (Lydenburg) Dullstroom (–AC), *Galpin s.n.* (24–12–1932, BOL); Witklip Forest Station (–BD), *Kluge 195, 626* (PRE); summit of Saddleback Mountain (–CC), *Galpin 1139* (BOL, GRA, NBG, NH, PRE). 2531 (Komatiipoort): Havelock Border Post (–CC), *Stirton 1464* (PRE).

NATAL.—2731 (Louwsburg): Mount Inyati (–CC), *Hilliard & Burt 5889* (NH, NU). 2830 (Dundee): The Kop (–DD), *Stirton 1033, 1040, 1041* (PRE).

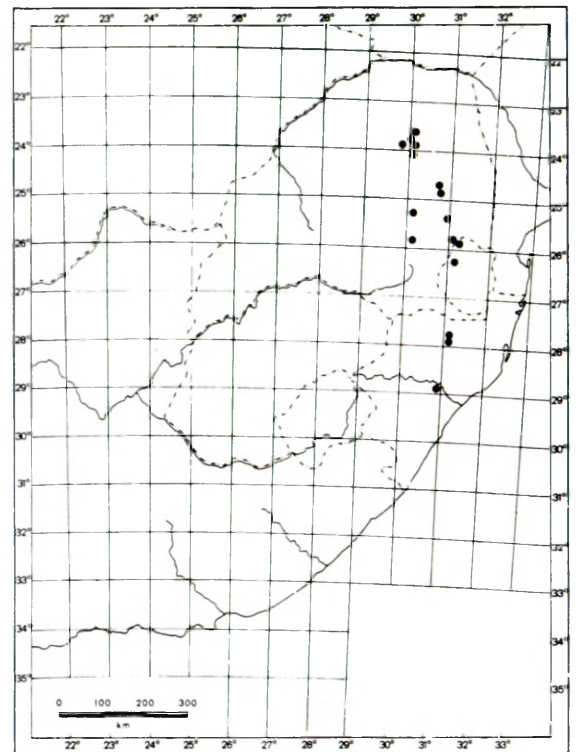


FIG. 5.—*Eriosema ellipticifolium*. Known distribution in Southern Africa.

Junod 2534 is chosen as lectotype, since the quantitative data given in the protologue indicates that Schinz must have based most of his description on the two specimens on this sheet.

This little-known species has proved to be more common and widespread than was previously accepted. The available herbarium material had been placed under no less than six species. It had been most commonly confused with *Eriosema cordatum* var. *cordatum*, but is readily separated from this and all other species by its very long calyx lobes which almost equal the length of the flower.

Despite its widespread distribution (Fig. 5) this species is remarkably uniform and distinctive in the field. Its poor representation in herbaria is probably attributable to its dwarf habit (Fig. 6) and not to its scarcity in the field as, during a recent trip to the eastern Transvaal, it was found to be locally common throughout the moist highlands.



FIG. 6.—*Eriosema ellipticifolium*: dwarf habit.

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UITTREKSEL

'n Ondersoek van al die beskikbare gegewens dui daarop dat *Eriosema nanum* Burt Davy 'n sinoniem van *E. ellipticifolium* Schinz is. Die verwantskappe tussen *E. ellipticifolium* en *E. uniflorum* Burt Davy word ook bespreek.

REFERENCES

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- STIRTON, C. H., 1975. *A contribution to knowledge of the genus Eriosema (Leguminosae-Lotoideae) in Southern Africa (excluding Mozambique and Rhodesia)*. Unpublished M.Sc. thesis, University of Natal, Pietermaritzburg. 182 pp.

APPENDIX

This appendix lists all specimens considered by the author to belong to *Eriosema ellipticifolium* Schinz:

Bolus 11854 (BOL); *Coetzer* 150 (PRE); *Galpin* s.n. (BOL), 1139 (BOL, GRA, NBG, NH, PRE); *Gilmore* 2284 (PRE); *Hilliard* 2942 (NU); *Hilliard & Burt* 3358 (NU), 5889, 5908 (NH, NU); *Junod* 1411, 2534 (Z); *Kluge* 195, 626 (PRE); *Muller* 2012 (PRE); *Pott* 4798 (PRE); *Rogers* 1160, 22057 (PRE); *Stirton* 1033, 1040, 1041, 1346, 1431, 1436, 1439, 1441, 1443, 1449, 1464, 1467, 1471, 1474, 1475, 1483, 1486, 1487 (PRE); *Vahrmeijer* 2433 (PRE); *Van der Schijff* 6440 (PRE).

