LAMIACEAE

REDISCOVERY IN SOUTH AFRICA OF THE NEGLECTED AFRICAN VEGETABLE *PLECTRANTHUS ESCULENTUS*

Plectranthus esculentus N.E.Br. was rediscovered in habitat during 2005, in rocky grassland on a hillside at Inanda, inland of Durban (Figure 8). Herbarium records reveal that this species has not been encountered in the wild by botanists in southern Africa for over 30 years, with several records reflecting collections from cultivation sites made predominantly during the early decades of the 20th century (e.g. *Van Warmelo TRV3617* PRE; *Gerstner 5436* PRE). Subsequent popularity of this crop in South Africa has evidently waned considerably, although limited use in Mpumalanga is reported to persist (Allemann 2002).

The rediscovery in South Africa of this taxon has significant implications for the strengthening of efforts to reintroduce, for household food security, a neglected African vegetable which is well adapted to areas of low agricultural potential. Only one other South African genotype (from Limpopo Province) is presently known, and is represented in the holdings of the Agricultural Research Council (ARC) at the Roodeplaat Vegetable and Ornamental Plant Institute (J. Allemann pers. comm. 2007). The current find at Inanda is of particular importance as the formation of tubers has been observed at latitude > 29.5°S (*Crouch 1237* NH) (Figure 9), somewhat beyond the range (15 °N–28 °S) determined for this species as a crop (Allemann & Hammes 2006). As such, this collection may represent a photoperiodic ecotype of agronomic consequence. *Plectranthus esculentus* is characterized by finger-like edible tubers (Figure 10) and bright yellow flowers (Pooley 1998) presented in short pseudoracemes during spring, usually after the leaves have been shed (Codd 1985). This geophyte produces several lax stems which trail amongst grasses and root at the nodes, thereafter seasonally producing stem tubers (Allemann *et al.* 2003). Plants at the Inanda site were found to not regenerate well from aerial parts, a characteristic earlier documented by Burkill (1995). This feature is shared with tuberous forms of *P. hadiensis* (Forssk.) Schweinf. ex Spreng. var. *hadiensis* which occur in grassland, the stems of which do not strike as well as those of genus members found in more mesic habitats. Success with striking of cuttings may relate to the timing of tuber initiation, which appears to retard aerial growth (J. Allemann pers. comm. 2008).

FIGURE 8.—*Plectranthus esculentus* in habitat, Inanda, KwaZulu-Natal. Photograph: N. Crouch.

The vegetation in which plants may be encountered at Inanda is referred to as KwaZulu-Natal Sandstone Sourveld (SVs 5) by Rutherford *et al.* (2006) who describe it as 'short, species-rich grassland with scattered low shrubs and geoxylic suffrutices'. The underlying geology is Ordovician Natal Group sandstones. This vegetation type is considered Endangered, with only 0.2 % statutorily conserved and some 68 % already transformed (Rutherford *et al.* 2006). The habitat of *Plectranthus esculentus* here comprises shallow soil amongst rocks, on the edge of, and above steep cliffs and escarpment edges at an altitude of ± 700 m. Small aggregations of fewer than ten individuals occur at scattered points on dry, northerly aspects over a distance of ± 500 m. The dominant grass amongst which this *Plectranthus* species grows is *Aristida junciformis* subsp. *junciformis*, which although a typical element in KwaZulu-Natal Sandstone Sourveld, also proliferates in response to overgrazing and overburning. Other associates include *Acalypha glandulifolia*, *Gymnosporia woodii*, *Pentanisia prunelloides*, *Phymaspermum pinnatifidum*, *Plectranthus hadiensis* var. *hadiensis*, *Tetraselago natalensis* and *Thunbergia atriplicifolia*. The site is neither suitable for, nor gives indication of prior cultivation by earlier inhabitants; accordingly the plant appears here to be native rather than naturalized. Similarly, Angolan subpopulations have been observed 'in [a] perfectly wild state' (Good & Taylor 1931) and in Zimbabwe within *Julbernardia* and *Brachystegia* woodland (Wild *et al.* 1972).

Elsewhere in South Africa, particularly in the vicinity of Nelspruit and Barberton, annotated herbarium specimen labels (e.g. *Lavranos 4681* PRE; *Repton 647* PRE; *Thorncroft 353* NH) indicate its natural occurrence. Wood (1896) noted that the species '[*Plectranthus esculentus*, or *umbondwe*] is cultivated [around Durban]

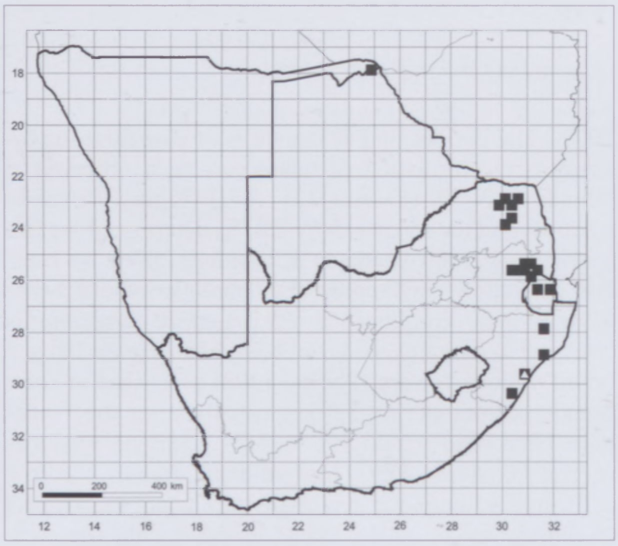

FIGURE 9.—Reported geographical distribution of *Plectranthus esculentus* in *FSA* region based on specimens at BOL, NBG, NH, NU, PRE and SAM, ■; extant subpopulation at Inanda, △.

by the natives, who use the tuber as a vegetable. I have not seen it in a wild state, but a closely allied species (*P. floribundus*, N.E.B.) is occasionally met with'. Gerstner (1938) similarly claimed that amongst the Zulus, *P. esculentus* is not found wild but that it had been planted 'since ancient times'. Forester Tustin of Ngome Forest in KwaZulu-Natal, in correspondence with his superiors during 1923 noted that 'I really do not know if the plant is indigenous to this part, or if it was previously brought here. It is chiefly found growing in old lands' (*Tustin s.n. PRE39880*). According to oral Zulu tradition, *P. esculentus* (as *umhlaza*) and *Colocasia esculenta* (L.) Schott (as *amadumbi*) were brought south of the Umfolozi River by a chief called Langa. He entered what was later to become Zululand from the direction of Swaziland, some ten generations before Tshaka (Webb & Wright 2001). Accordingly, *P. esculentus* may have been introduced to the region in the mid- to late 16th century.

Based on his field observations, Wood (1896) evidently considered *Plectranthus esculentus* distinct from *P. floribundus* N.E.Br., a taxon described from an Inanda collection of his. Accordingly, it is likely that the Zulus at Inanda were at that time cultivating at least one morphologically distinct landrace of *P. esculentus*. Fox & Norwood Young (1982) recorded that cultivation of different varieties was once commonplace in the Msinga District on the middle Thugela. Such local diversity may further be inferred from the variety of isiZulu names for this species—no fewer than sixteen are documented (Wood 1896; Bryant 1908; Gerstner 1938; Fox & Norwood Young 1982; Allemann 2002). After 15 years of ethnobotanical experience, the first author is yet to encounter this edible lamiate in cultivation; as elsewhere (Burkill 1995), this starch-rich and otherwise nutritious crop (Allemann & Hammes 2003) has been displaced by less labour-intensive and sometimes higher-yielding introductions. These include *Ipomoea batatas* (L.) Lam. (sweet potato) and maize (*Zea mays* L.) from the New World, and the Old World *Colocasia esculenta* (taro, *idumbe*) from Asia. By the late 19th and early 20th centuries, these crop species were well established amongst the Zulus (Wood 1896; Bryant 1908). During the last century, cultivation of the New World starch crop *Solanum tuberosum* L. (potato) has further marginalized *Plectranthus esculentus*. As *P. esculentus* has been codispersed synanthropically, its natural distribution is imprecisely known, although this may at one time have extended from Senegal in Equatorial Africa broadly southwards to coastal KwaZulu-Natal (Codd 1975; Burkill 1995). The original site of domestication and dispersal is uncertain, with various authors proposing West (Purseglove 1976), Central (Portères 1962), South-central or East (Greenway 1944) Africa. It has reasonably been surmised that domestication occurred independently in different regions across its wide range (Shaw 1976). Whereas several centres of cultivation are known from various Central African countries, e.g. Nyanga terraces in eastern Zimbabwe (Sutton 1984), some user groups eat only wild-sourced material, and then just as a supplement or famine food (Burkill 1995). This may reflect social stigmas which have led to preferences for exotic crops (Kyesmu 1994).

Plectranthus esculentus and *P. floribundus* were described synchronously by Brown (1894) who distinguished them on account of the latter species bearing taller, more erect stems, and closely sessile leaves with

FIGURE 10.—Stem tuber cluster of a *Plectranthus esculentus* plant sourced from Inanda, KwaZulu-Natal. Photograph: N. Crouch.

broader, rounded bases, more prominent reticulation and a rougher surface. Good & Taylor (1931) subsequently placed *P. floribundus* in synonymy under *Coleus esculentus* (N.E.Br.) G.Tayl., so allowing for a circumscription that accommodates the wide diversity of cultivars known, as well as natural variation across its range. Subsequent workers on African Lamiaceae have accepted this broader species concept (Codd 1975, 1985; Van Jaarsveld 2006).

Rutherford *et al.* (2006) observed that most of the remaining areas of KwaZulu-Natal Sandstone Sourveld are subjected to grazing pressures and fire frequencies that are not conducive to the recruitment of seedlings. This is evident at the Inanda site where the leafless shoots of plants have, for three consecutive years, been burned off by intentional fires set during the winter months. This has resulted in non-flowering and a lack of seed set. The grassland in which *Plectranthus esculentus* occurs, still retains a fair diversity of forbs and geophytes, particularly in the rockiest parts. However, without respite from these impacts and encroaching urban sprawl, the trend over time will be towards increased degradation and loss of species diversity. *P. esculentus* is a rare species within its habitat, and is therefore likely to become even more so in future. In view of the above, further collections from the last-known South African locality of *P. esculentus* should be genebanked as a matter of urgency, if residual germplasm diversity is to be conserved.

Specimen examined

KWAZULU-NATAL.—2930 (Pietermaritzburg): Inanda, in grassland along rocky ridge, 715 m, S 29° 36' 19.18"; E 30° 49' 34.01", (–DB), 08-04-2009, *Crouch 1237* (NH).

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REFERENCES

ALLEMANN, J. 2002. *Evaluation of* Plectranthus esculentus *N.E.Br. as a potential vegetable crop*. Ph.D. thesis, University of Pretoria. Unpublished.

ALLEMANN, J. & HAMMES, P.S. 2003. Chemical composition of South African *Plectranthus esculentus* tubers. *South African Journal of Science* 99: 127–129.

ALLEMANN, J. & HAMMES, P.S. 2006. Effect of photoperiod on tuberization in the Livingstone potato (*Plectranthus esculentus* N.E.Br. Lamiaceae). *Field Crops Research* 98: 76–81.

ALLEMANN, J., ROBBERTSE, P.J. & HAMMES, P.S. 2003. Organographic and anatomical evidence that the edible storage organs of *Plectranthus esculentus* N.E.Br. (Lamiaceae) are stem tubers. *Field Crops Research* 83: 35–39.

BROWN, N.E. 1894. Tuberous Labiatae. *Kew Bulletin*: 10–14.

BRYANT, A.T. 1908. *A description of native foodstuffs and their preparation*. Times Printing and Publishing, Pietermaritzburg.

BURKILL, H.M. 1995. *The useful plants of West tropical Africa*, vol. 3. Families J–L, edn 2. Royal Botanic Gardens, Kew.

CODD, L.E. 1975. *Plectranthus* (Labiatae) and allied genera in southern Africa. *Bothalia* 11: 371–442.

CODD, L.E. 1985. Lamiaceae. *Plectranthus*. *Flora of southern Africa* 28,4: 137–172.

FOX, F.W. & NORWOOD YOUNG, M.A. 1982. *Food from the veld*. Delta Books, Cape Town.

GERSTNER, J. 1938. A preliminary check list of Zulu names of plants. *Bantu Studies* 12: 215–236.

GOOD, R.D. & TAYLOR, G. 1931. Mr John Gossweiler's plants from Angola and Portuguese Congo. Dicotyledones. Gamopetalae. Labiatae. *Journal of Botany British and Foreign* 69, suppl. 1: 146–168.

GREENWAY, P.J. 1944. Origins of some East African food plants. Part 1. *East African Agricultural Journal* 10: 34–39.

KYESMU, P.M. 1994. *Plectranthus esculentus* N.E.Br. A minor tuber crop in dire need of rescue from extinction. *Lamiales Newsletter* 3: 3–5.

POOLEY, E. 1998. *A field guide to wild flowers of KwaZulu-Natal and the eastern region*. Natal Flora Publications Trust, Durban.

PORTÈRES, R. 1962. Berceaux agricoles primaires sur le continent Africain. *Journal of African History* 3: 195–210.

PURSEGLOVE, J.W. 1976. The origins and migrations of crops in tropical Africa. In J.R. Harlan, J.M. de Wet & A.B.L. Stemler, *Origins of African plant domestication*: 291–309. Mouton, The Hague & Paris.

RUTHERFORD, M.C., MUCINA, L., LÖTTER, M.C., BREDENKAMP, G.J., SMIT, J.H.L., SCOTT-SHAW, C.R., HOARE, D.B., GOODMAN, P.S., BEZUIDENHOUT, H., SCOTT, L., ELLIS, F., POWRIE, L.W., SIEBERT, F., MOSTERT, T.H., HENNING, B.J., VENTER, C.E., CAMP, K.G.T., SIEBERT, S.J., MATTHEWS, W.S., BURROWS, J.E., DOBSON, L., VAN ROOYEN, N., SCHMIDT, E., WINTER, P.J.D., DU PREEZ, J., WARD, R.A., WILLIAMSON, S. & HURTER, P.J.H. 2006. Savanna Biome. In L. Mucina & M.C. Rutherford, The vegetation of South Africa, Lesotho and Swaziland. *Strelitzia* 19: 438–538.

SHAW, T. 1976. Early crops in Africa: a review of the evidence. In J.R. Harlan, J.M. de Wet & A.B.L. Stemler, *Origins of African plant domestication*: 107–154. Mouton, The Hague & Paris.

SUTTON, J.E.G. 1984. Irrigation and soil conservation in African agricultural history with a reconsideration of the Inyanga terracing (Zimbabwe) and Engaruka irrigation works (Tanzania). *Journal of African History* 25: 25–41.

VAN JAARSVELD, E. 2006. *The southern African* Plectranthus *and the art of turning shade into glade*. Fernwood Press, Simon's Town.

WEBB, C.B. & WRIGHT, J.B. 2001. *The James Stuart archive of recorded oral evidence relating to the history of the Zulu and neighbouring peoples*, vol. 5. University of Natal Press and Killie Campbell Africana Library, Pietermaritzburg and Durban.

WILD, H., BIEGEL, H.M. & MAVI, S. 1972. *A Rhodesian botanical dictionary of African and English plant names*. Government Printer, Salisbury.

WOOD, J.M. 1896. Native herbs, medicinal and otherwise. *The Natal Almanac Directory and Yearly Register*: 260–265.

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