



Hyobanche hanekomii (Orobanchaceae), a new species from the Western Cape of South Africa

ANDREA D. WOLFE

Department of Evolution, Ecology, and Organismal Biology, The Ohio State University, 318 W. 12th Avenue, Columbus, Ohio 43210.
E-mail: wolfe.205@osu.edu

Abstract

The new species *Hyobanche hanekomii* is described and illustrated. It is somewhat intermediate in appearance between *H. sanguinea* and *H. atropurpurea*, but can be distinguished from both in several morphological characters that are presented. The new species occurs in the Cape Fold Belt Mountains of the northwest part of the Western Cape.

Key words: Cape Floristic Region, holoparasite, parasitic plant

Introduction

Hyobanche L. (1771: 253) (Orobanchaceae) is a small holoparasitic genus endemic to southern Africa. The genus is currently comprised of seven species (Wolfe 2013, 2017): *H. atropurpurea* Bolus (1885: 67), *H. barklyi* Brown (1901: 129), *H. fulleri* Phillips (1923: 89), *H. robusta* Schönland (1913: 301), *H. rubra* Brown (1901: 129), *H. sanguinea* Linné (1771: 253), and *H. thinophila* Wolfe (2013: 57). Currently, *H. sanguinea* and *H. rubra* have the largest distributions (Wolfe 2017), encompassing most of South Africa. However, *H. sanguinea* has been confusing because of the morphological variation exhibited by herbarium specimens identified as this species. The type specimen for *H. sanguinea* was only recently designated (Wolfe 2017), and this enables a more thorough analysis of herbarium specimens exhibiting similar morphologies—namely, collections of *Hyobanche* having flowers that are hairy, galeate, and in the red colour spectrum.

Little taxonomic work has been conducted in *Hyobanche* since the brief description of *H. sanguinea* by Linnaeus (1771). The most comprehensive treatment was by Hiern (1904), but included only four of the seven species since three were described after this publication (Schönland 1913, Phillips 1923, Wolfe 2013). A discussion of the challenges in identifying species of *Hyobanche* was given in Wolfe (2013), and these are mostly due to a lack of good descriptions and a robust key for identification. Over the course of many field seasons from 1996 to 2013, the author found that populations of *Hyobanche sanguinea* examined from freshly collected material exhibit many differences in morphology. These differences are more difficult to observe from dried herbarium specimens, because the plants are very succulent and dry as a black and sticky mass, which makes flower dissection a particular challenge.

Because of the taxonomic confusion, the author undertook a study of *Hyobanche* to examine character differences among herbarium specimens as well as freshly-collected material. Here, the author describes the first of several new species of *Hyobanche* from material that was labelled as *H. sanguinea* in herbarium collections.

Hyobanche hanekomii A. Wolfe *spec. nov.* Fig. 1 A–D, Fig. 3A.

Corolla deep magenta to magenta-red, inflated above the tube and semi-galeate, and 1.5–2.0 times the length of the calyx.

TYPE:—SOUTH AFRICA. Western Cape: 1 km south of Lentelus near Citrusdal, 400 m, 26 September 1997, *W.J. Hanekom 2887* (Holotype: NBG 759260!)

Perennial holoparasitic herb; achlorophyllous, lacking leaves and roots; rhizomatous with one to several yellowish rhizomes extending deep into ground, numerous secondary haustoria forming from scales where host roots contact rhizome; scales oblong to obtrullate, 5.4–7.4 × 3.6–8.8 mm, apex rounded to obtuse, abaxial surfaces of above-

ground scales puberulent to pubescent with multicellular trichomes near apex, scales mostly glabrous below ground. Inflorescence a densely-flowered spike, obovate to oblong, 66–136 × 35–83 mm; flowers strongly inflated and semi-galeate above a narrow tube, with two lateral bracteoles, subtended by a single bract on the abaxial side; floral bract 13–18 × 8–11 mm, ovate to oblong, sometimes slightly spatulate, and keeled adaxially, obtuse to rounded, upper margins entire to slightly scarios, proximally glabrous to puberulent near the apex, becoming pubescent to pilose on the distal abaxial surface and glabrous to puberulent on the distal adaxial surface; bracteoles 17–28 × 3–4 mm, oblanceolate to broadly linear, acute to acuminate, the upper half pubescent to pilose. Flowers subsessile to pedicellate; calyx 22–32 mm, with five sepals fused to $\frac{1}{4}$ – $\frac{2}{3}$ their length, sepal lobes broadly lanceolate, apex acute to slightly rounded, pilose; corolla dark magenta to purplish-red, 39–55 × 11–14 mm, slightly galeate, broadly inflated above constricted tube 4–14 × 6–8 mm, with two lapel-like lateral lobes and a long denticle at the base of the corolla mouth, lateral lobes reflexed, denticle 1.3–7.5 mm, corolla mouth 15–28 mm, pilose on exterior surface, puberulent with short glandular trichomes on interior surface; stamens 4, inserted on the corolla at the point of constriction, 31–37 mm, one pair slightly shorter than the other, filaments slightly curved at base, glabrous, anthers 3.8–4.6 × 1.8–2.4 mm, calceiform, one-celled, small knob or spur on proximal end from vestigial theca, apical pore elongated and slightly recurved, equal to the corolla mouth to slightly exserted at maturity; pistil strongly recurved below stigma, stigma exserted, clavate, strongly bilobed dorsiventrally. Fruits not seen.

Phenology. *Hyobanche hanekomii* flowers in the late winter to early spring (late August–mid-October), depending on the timing of the winter rains in the Western Cape. One to several inflorescences arises from a single rhizome that may be more than a meter in length.

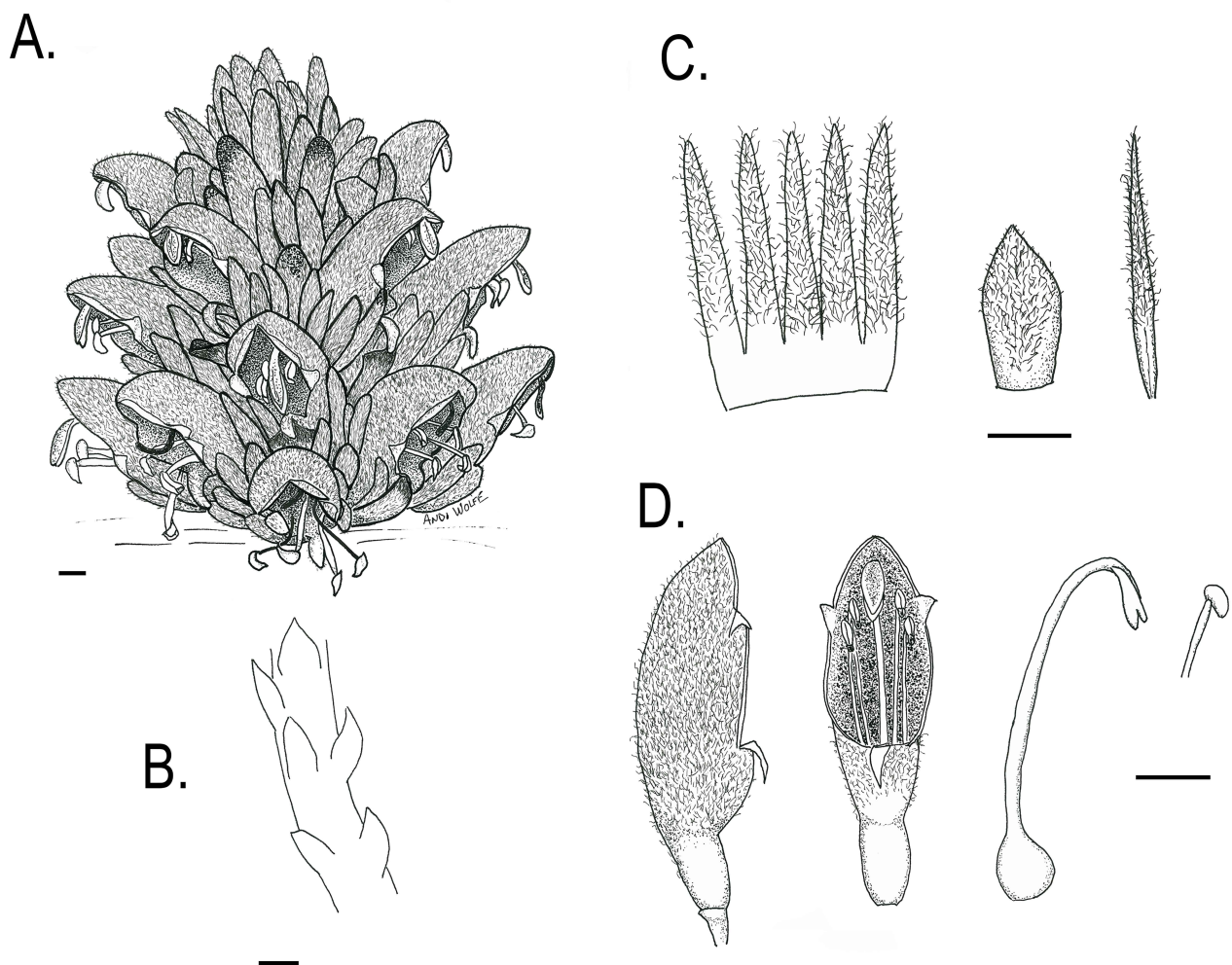


FIGURE 1. A–D. *Hyobanche hanekomii*. A. Habit. B. Rhizome. C. From left to right: Calyx, flower bract and bracteole. D. From left to right: corolla side view, corolla front view, gynoecium, anther. Scale bar for each pane represents 10 mm. Artist: A. Wolfe. Vouchers: Hanekom 2887; Wolfe 1009.

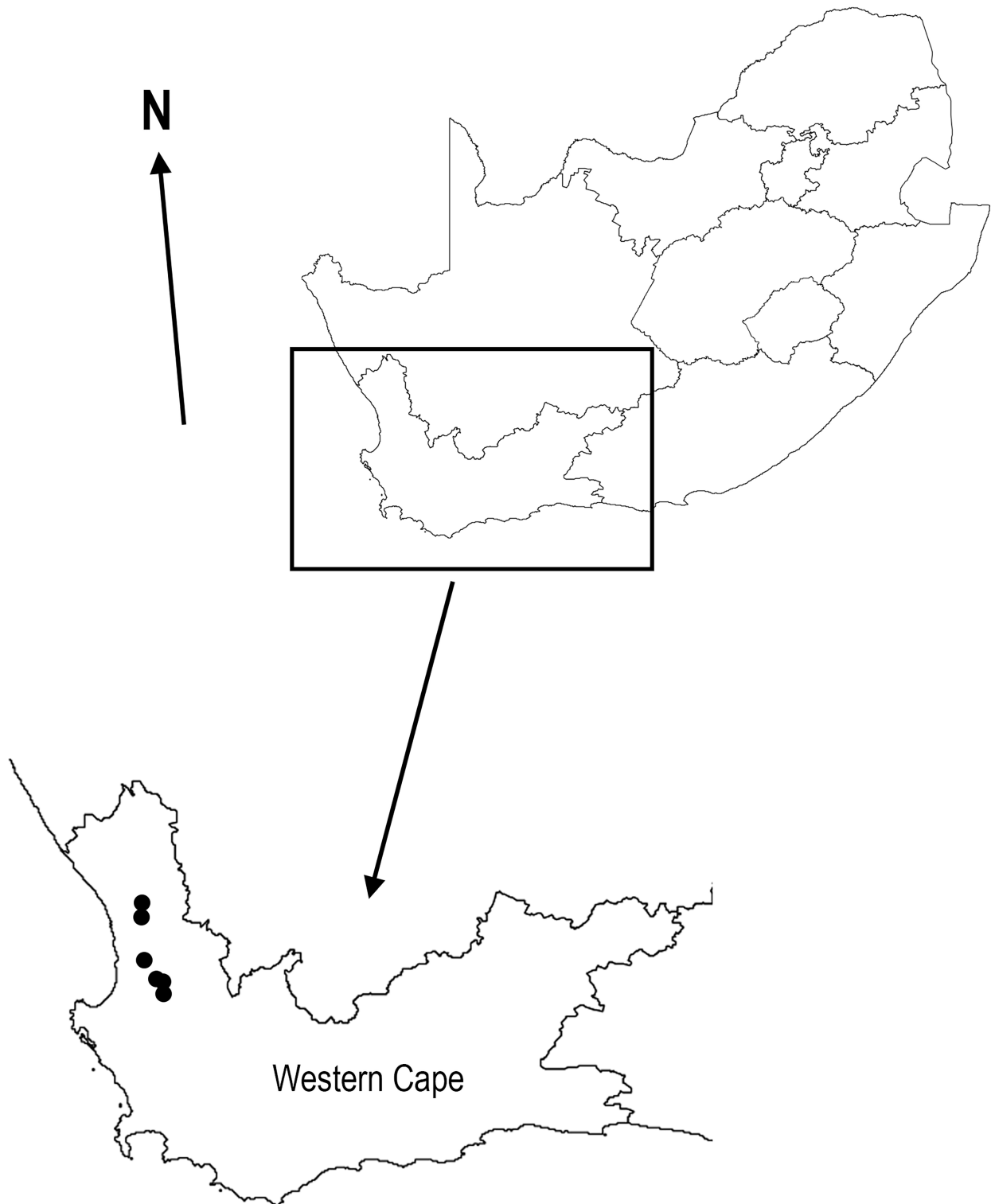


FIGURE 2. Distribution map of *Hyobanche hanekomii*, which is endemic to the Cape Fold Mountains of the Western Cape from about Citrusdal to near Van Rhyndorp.

Distribution. Rocky soils in Cape Fold Belt Mountains of northwestern region of the Western Cape, from Citrusdal area to Gifberg (Fig. 2).

Etymology. The specific epithet is in honour of Mr. Willem Johannes Hanekom (b. 1931). Mr. Hanekom is a keen observer of the flora of the Western Cape, and introduced the author to this new species in 2001. He had made a collection in 1997 (*W. J. Hanekom 2887*), which included the following note: “*Hyobanche sanguinea* L. but with influence of *H. atropurpurea* H. Bol.”

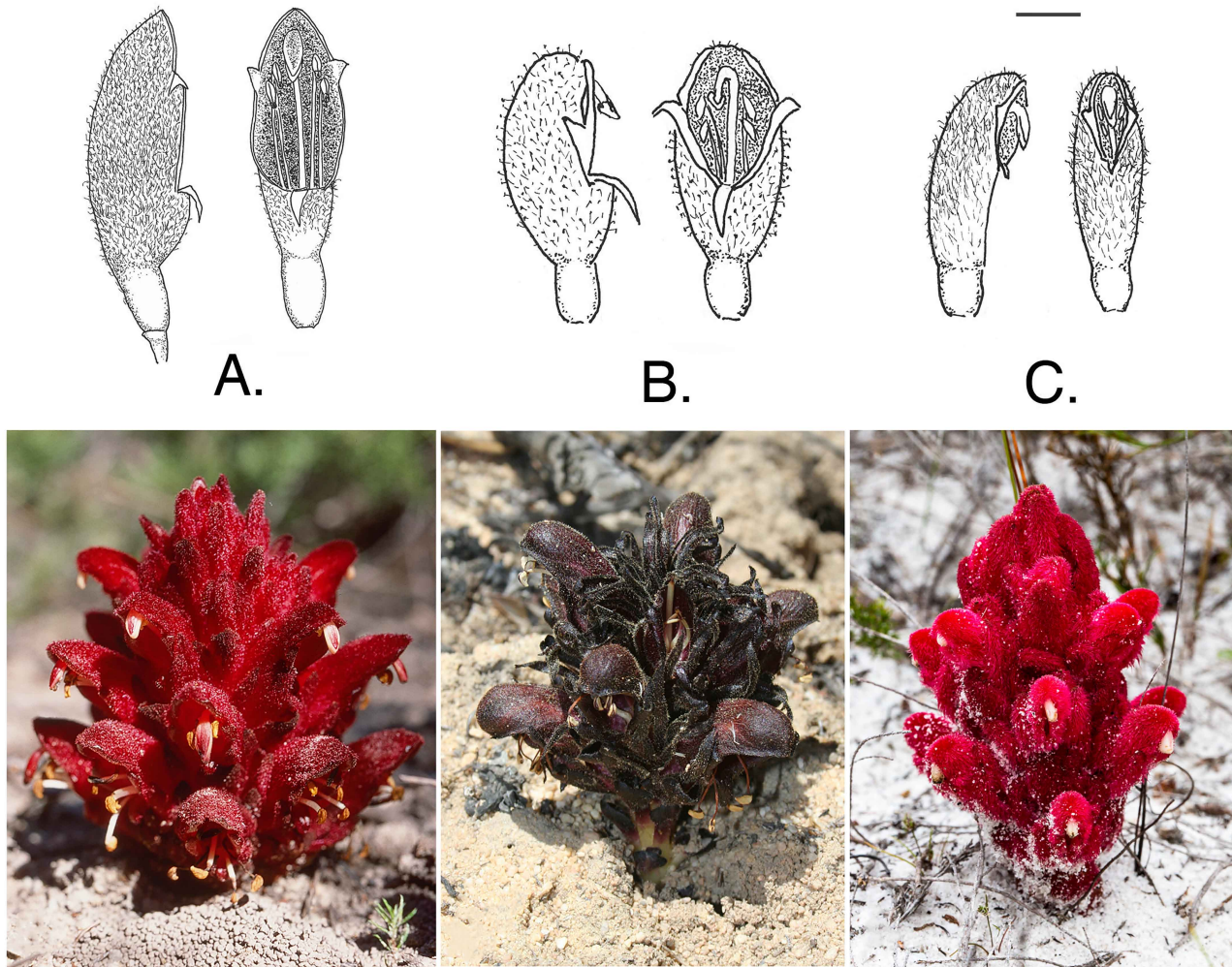


FIGURE 3. Comparison of *Hyobanche hanekomii* (A), *H. atropurpurea* (B), and *H. sanguinea* (C). Upper panel represents side and front views of corollas to scale (bar = 10 mm). Lower panel shows inflorescences (not to scale). Illustrations and photographs by A. Wolfe; photos are from living plants in prime blooming condition. Vouchers: (A) upper panel: *Hanekom 2887* (1997, NBG); lower panel: *Wolfe 1009* (2001, OS); (B) *Wolfe 1227* (2006, OS); (C) *Wolfe 1387* (2013, OS).

Common names [Afrikaans (English)]. Hanekom’s katnaels (Hanekom’s cat nails), Hanekom’s wolwekos (Hanekom’s wolf’s food), Hanekom’s inkbloem (Hanekom’s ink bloom). The white, exerted and recurved styles of *Hyobanche sanguinea* are the primary reason for katnaels as a common name. Wolwekos as a common name is a misnomer. Wolves are not native to South Africa, although there are several species of canids in the region (jackals, foxes, and wild dogs; Stuart & Stuart 2001). The origin of this common name is unknown, but may refer to the resemblance of the inflorescence to fresh scraps of carrion (Manning 2007). Inkbloem refers to the use of the plant for making ink (Smith 1966). *Hyobanche*, similar to other genera in Orobanchaceae, tends to dry black after harvesting the inflorescence. Dried material is then ground into a powder and added to liquid to make ink.

Taxonomic notes and ecology. Although Mr. Hanekom thought this species may be a hybrid between *H. sanguinea* and *H. atropurpurea*, the author’s field notes (2001) of the population from which his 1997 collection was made included the observation that all the individuals in the population were consistent in shape, colour and form, and did not resemble a hybrid swarm. Furthermore, morphometric and AFLP marker studies have not supported a hypothesis of hybridization between *H. atropurpurea* and *H. sanguinea* (unpublished data).

Hyobanche hanekomii is differentiated from *H. atropurpurea* and *H. sanguinea* as follows (see also Fig. 3)

- | | | |
|----|---|------------------------|
| 1. | Corolla deep purple to purplish-black | <i>H. atropurpurea</i> |
| - | Corolla red or magenta | 2 |
| 2. | Corolla red, strongly galeate, not inflated above the tube, and corolla and calyx length nearly equal | <i>H. sanguinea</i> |
| - | Corolla deep magenta to magenta red, semi-galeate, strongly inflated above tube, corolla length 1.5–2.0 times length of calyx | <i>H. hanekomii</i> |

Hyobanche hanekomii occurs in fynbos habitat, primarily in Bokkeveld, Cederberg, and Olifants Sandstone Fynbos communities (Mucina & Rutherford 2006). The host range for *Hyobanche* is difficult to determine based on the proximity of other plants because the rhizome system of the parasite can be quite extensive. *Hyobanche hanekomii* has been collected in proximity to *Elytropappus* (Asteraceae), *Passerina* (Thymelaeaceae), *Phyllica* (Rhamnaceae), and *Restio* (Restionaceae). Other species of *Hyobanche*, which have had host root identification via DNA analysis, have host plants from *Metalasia* (Asteraceae), and *Passerina* (Wolfe 2013).

Pollination studies have indicated sunbird pollination for *H. sanguinea* (Turner and Midgley 2016), and elephant shrew pollination for *H. atropurpurea* (Wester 2011). Given the intermediate morphology of *H. hanekomii* compared to these other species (Fig. 3), floral visitation could be by either, or both, birds or small mammals, and further investigation is needed.

Additional specimens examined: SOUTH AFRICA. Western Cape: Matsikamma Mountains, 3318 DB, 152 m, 30 August 1976, *Stirton 5951* (PRE!); Heerenlogements Mountains, 3118 DC, 609 m, 4 September 1976, *Stirton 6093* (PRE!); Giftberg, 762 m, 14 October 1953, *Esterhuysen 21987* (BOL!); Hills between Witte Els Kloof and Lambert's Hoek Berg, 11 October 1939, *Pillans 9165* (BOL!); Citrusdal-Ceres Road, between Lentelus and Appalto, S 32° 37' E 19° 025', 427 m, 9 October 2001, *Wolfe 1009* (OS!).

Acknowledgements

Funding for this project was provided by the National Science Foundation (DEB 9708322). The author thanks Compton Herbarium for logistical support with special thanks to D. Snijman, W. Hanekom, W. Elisens, J. Morawetz, and S. Wolfe, for their kind assistance in the field; J. Freudenstein; members of the Wolfe Lab, D. Giannantonio, and an anonymous reviewer, for helpful discussions on this manuscript.

References cited

- Bolus, H. (1885) *Hyobanche atropurpurea*. In: Hooker, J.D. (Ed.) *Hooker's Icones Plantarum; or, figures, with descriptive characters and remarks of new and rare plants, selected from the Kew Herbarium. Vol. VX, Part IV*. Williams and Norgate, London, 80 pp.
- Brown, N.E. (1901) *Hyobanche barklyi* and *Hyobanche rubra*. *Bulletin of Miscellaneous Information, Kew* 1901: 129.
- Hiern, W.P. (1904) Scrophulariaceae In: Thiselton-Dyer, W.T. (Ed.) *Flora Capensis: Being a systematic description of the plants of the Cape Colony, Caffraria, & Port Natal (and neighboring territories)*, Vol. 4, pt 2. Lovell Reed & Co., London, 479 pp.
- Linné, C. (1771) *Mantissa plantarum altera*. Salvius, Stockholm, 444 pp.
- Manning, J. (2007) *Field Guide to Fynbos*. Struik Nature, Cape Town, pp. 466–467.
- Mucina, L. & Rutherford, M.C. (2006) *The vegetation of South Africa, Lesotho, and Swaziland. Strelitzia* vol. 19. South African National Biodiversity Institute, Pretoria, pp. 135–145.
- Phillips, E.P. (1923) *Hyobanche fulleri*. *Flowering Plants of South Africa* 3: Pl. 89.
- Schönland, S. (1913) *Hyobanche robusta*. *Bulletin of Miscellaneous Information, Kew* 1913: 301.
- Smith, C.A. (1966) *Common names of South African plants*. Botanical Survey Memoir No. 35; Department of Agricultural Technical Services, Pretoria, 255 pp.
- Stuart, C. & Stuart, T. (2001) *Mammals of southern, central, and east Africa – a photographic guide*. Struik Publishers Ltd., Cape Town, pp. 80–85.
- Turner, R.C. & Midgley, J.J. (2016) Sunbird-pollination in the geoflorous species of *Hyobanche sanguinea* (Orobanchaceae) and *Lachenalia luteola* (Hyacinthaceae). *South African Journal of Botany* 102: 186–189.
<https://doi.org/10.1016/j.sajb.2015.07.004>
- Wester, P. (2011) Nectar feeding by the Cape rock elephant-shrew *Elephantulus edwardii* (Macroscelidea) – A primarily insectivorous mammal pollinates the parasite *Hyobanche atropurpurea* (Orobanchaceae). *Flora* 206: 997–1001.
<https://doi.org/10.1016/j.flora.2011.05.010>
- Wolfe, A.D. (2013) *Hyobanche thinophila* (Orobanchaceae), a new species from the Western Cape of South Africa. *Phytotaxa* 85: 56–60.
<https://doi.org/10.11646/phytotaxa.85.2.3>
- Wolfe, A.D. (2017) Typification of *Hyobanche sanguinea* (Orobanchaceae) and the identity of *Hyobanche calvescens* and *Hyobanche glabrata*. *Phytotaxa* 299: 132–136.
<https://doi.org/10.11646/phytotaxa.299.1.12>