Summary. The endemic South African root parasite *Harveya purpurea* (L.f.) Harvey subsp. *purpurea* (Orobanchaceae) is illustrated and described, and its history, taxonomy, life cycle, host plants and distribution are given.

Parasitic flowering plants are very well represented in southern Africa by nine families, 34 genera and more than 300 species, including annual and perennial herbs, climbers and shrubs (Germishuizen & Meyer, 2003). One of the most bizarre and ‘unplantlike’ members from the region is *Hydnora africana* Thunb. (Hydnoraceae), (see p. 293) a root parasite on *Euphorbia* species, producing a solitary large, fleshy brown and orange flower emitting an unpleasant odour, which attracts the carrion beetles that effect pollination. While the flowers of many parasitic species of the region are inconspicuous, a number are of exceptional beauty, especially those belonging to the genera *Harveya* Hook. and *Hyobanche* L.; the latter is also a member of the Orobanchaceae, producing bright reddish-pink spikes at ground level, illustrated above.

There are two weedy introductions from the Mediterranean to southern Africa from the Orobanchaceae, the purplish blue-flowered *Orobanche ramosa* L. that attacks mainly cultivated hosts in Namibia and the western and northern parts of South Africa, and the extremely prolific but much less attractive *O. minor* Sm. with brownish flowers, that has established itself in the Western and Eastern Cape, and in Namibia. Both of these are annuals and as they are completely devoid of chlorophyll, are entirely host-dependent.

The genus *Harveya* was named for Dr William Henry Harvey (1811–1866), the Irish botanist renowned for his expertise in marine algae and mosses, who was Treasurer-General of the Cape Colony from 1836 to 1838, principal author (with Dr O. W. Sonder of Hamburg) of the first three volumes of the *Flora Capensis*, and later became Professor of Botany at the University of Dublin, Ireland. When he learnt that his life-long friend Sir William Hooker, had named the genus for him, Harvey was delighted and wrote in a letter dated October 2, 1837 (regarding *Harveya capensis*
Plate 664  *Harveya purpurea* subsp. *purpurea*

VICKI THOMAS
Hook., the type species (Hooker, 1837), a beautiful light pink-flowered species from the Cape):

‘Tis a very lovely plant, with which I am highly pleased and flattered. Tis apropos to give me a genus of Parasites, as I am one of those weak characters that draw their pleasures from others, and their support and sustenance too, — seeing I quickly pine if I have not someone to torment’ (Anonymous, 1869).

Reports of Harvey’s period in office as Colonial Treasurer-General suggest he almost certainly held his botanical interests way in higher regard than his official duties, and that much of his ‘working’ time was spent exploring the richness of the Cape Peninsula flora, leading those unaware of his sterling botanical work to refer to him as ‘Her Majesty’s Pleasurer at the Cape’. It was therefore somewhat unfortunate that Hooker resolved to name a genus of parasites after Harvey while he still held office (Geary-Cooke, 1975).

Harvey, who hailed from Summerville near Limerick, spent about four years at the Cape, spread over three periods between 1835 and 1842. Having the will and energy to launch a project of the magnitude of the Flora Capensis series showed him (in botanical terms) to be anything but a parasite. He studied the flora of the Cape Peninsula in great detail and benefitted from material gathered by well-travelled collectors of the time including James Bowie, who had been sent to the Cape by Sir Joseph Banks to collect for Kew, Ludwig Pappe, the first Colonial Botanist, and the German botanical collector stationed at Uitenhage, Carl Zeyher, which greatly assisted him in his compilation of Genera of South African Plants that appeared in 1838. The latter publication is widely regarded as the first substantial botanical book published in South Africa (Warner & Rourke, 1996). He contributed the major part of the text for the first three volumes of Flora Capensis that appeared in 1860, 1862 and 1865 respectively, while at the same time producing two volumes of his Thesaurus Capensis, or Illustrations of the South African Flora between 1859 and 1863, comprising 200 lithographed sketches of new or interesting plants drawn by himself from specimens in the Trinity College, Dublin Herbarium (Gunn & Codd, 1981). The latter title was designed as a companion volume and illustration of the Flora Capensis. To appreciate the enormity of the task Harvey initiated in
**Flora Capensis**, it is necessary to point out that the work only reached completion in 1933, nearly 70 years after his death. Sir William Thiselton-Dyer, a former Director of Kew, edited volume 4 of the work, which ran to six parts, and the seventh and last volume finally appeared in 1933.

Previously placed in the family Scrophulariaceae, *Harveya* now forms part of the Orobanchaceae or Broomrape family that is encountered mainly in warmer climates and is especially well represented in the Mediterranean. The genus is concentrated in southern Africa and is encountered in all nine provinces of South Africa (mostly in the Western and Eastern Cape and KwaZulu-Natal) as well as in Lesotho and Swaziland. Its distribution extends northwest to Angola and the Democratic Republic of Congo, north and northeast to Zimbabwe, Zambia, Burundi, Rwanda, Tanzania, Kenya and Eritrea, and is also represented in southwest Yemen on the Arabian Peninsula, and on the Indian Ocean islands of Madagascar and the Comoros. *Harveya* currently comprises a total of 41 species, of which 13 occur in southern Africa (Randle, 2006).

The almost exclusively African genus *Harveya*, the endemic southern African *Hyobanche* and the temperate European and Asian *Lathraea* L. have been viewed as transitional links between the parasitic members of the Scrophulariaceae and the strictly holoparasitic habit of the Orobanchaceae; phylogenetic analyses, however, have shown these genera not to be transitional to the traditional Orobanchaceae, but to represent multiple independent origins of holoparasitism (Young *et al.*, 1999), see page 307. The seeds of most members of the Orobanchaceae are extremely long-lived and can remain dormant in the soil for up to 15 years. Seed germination in this family is thought to be highly specialised because it is suspected they require a chemical stimulant for germination that is produced by the host root. This mechanism is thought to have evolved not only to ensure that the seed will only germinate in the presence of the host, but also so that the seedlings are close enough to the host’s roots to attach themselves successfully. The minuteness of the seed necessitates the almost immediate acquisition of nutrients from the host once germination has commenced.

*Harveya* is a holoparasitic genus living on the roots of a range of woody plants and deriving all its nutrients from its host. Its roots
penetrate and proliferate inside the root systems of adjacent host plants by means of round, knobbly haustoria. Water and carbohydrate reserves are drawn from the host through the haustoria and support the growth of the brightly coloured inflorescences that emerge in spring and summer (Visser, 1981).

*Harveya purpurea* was first described as *Orobanche purpurea* by Linnaeus *fil.* (1781) in his *Supplementum Plantarum* and transferred to *Harveya* by W. H. Harvey as *H. purpurea* (L. *fil.*). Harvey in his *Genera of South African Plants* (Harvey, 1838). Bentham (1846) placed it in the genus *Aulaya* as *A. purpurea* (L. *fil.*). Bentham, but it was returned to *Harveya* by Hiern (1904) in his revision of the genus in *Flora Capensis*. In a recent revision of the genus *Harveya* in southern Africa (Randle, 2006), three infraspecific taxa are recognised within *H. purpurea*: *H. purpurea* subsp. *euryantha* (Schltr.) Randle that occurs in the southern part of the Western Cape around Caledon and Bredasdorp, *H. purpurea* subsp. *sulphurea* (Hiern) Randle that has sulphur-yellow flowers and is restricted to the Cederberg Mountains near Clanwilliam in the northwestern part of the Western Cape, and *H. purpurea* subsp. *purpurea* (the subject of this account) that is widespread in acid soils on lower mountain slopes and flats from the north-western part of the Western Cape to the eastern part of the Eastern Cape, from sea
level to 700 m, and is most frequently encountered in fynbos of the south-western and southern parts of the Western Cape. The subsp. *euryantha* differs from subsp. *purpurea* and subsp. *sulphurea* mainly in having a broader corolla tube, and subsp. *sulphurea* is distinguished in having a white to yellow corolla tube with sulphur-yellow petal lobes.

*Harveya purpurea* subsp. *purpurea* is a very showy plant and it is easily recognised by its large purple or light to deep pink, funnel-shaped, bilabiate flowers that have a prominent yellow marking in the throat and are sweetly fruit-scented. The broad, slightly curved corolla tube can be light pink, yellowish-white or light purplish-yellow. The aerial scale-like leaves are arranged in opposite pairs along a rigid scape and are silky-hairy, whereas those at the base of the scape and below ground level are smooth, much smaller and distinctly imbricate. It may be seen in flower anytime from spring to midsummer and is usually encountered in sheltered places on acid sandy flats and lower mountain slopes, in full sun or semi-shade. It has been recorded living off the roots of many different woody hosts, including *Leucadendron* (Proteaceae), grasses such as *Chrysopogon* (Poaceae), *Anthospermum* (Rubiaceae), *Erepsia* (Aizoaceae), *Myrsine* (Myrsinaceae) and the genera *Prismatocarpus*, *Roella* and *Wahlenbergia* (Campanulaceae). Other host genera parasitised by *Harveya* species in southern Africa include *Othonna*, *Osmiopsis* and *Ursinia* (Asteraceae), *Cliffortia* (Rosaceae), *Erica* (Ericaceae), *Rhus* (Anacardiaceae), *Galopina* (Rubiaceae), *Hypericum* (Hypericaceae) and *Willdenowia* (Restionaceae) (Visser, 1981).

The flowers of several *Harveya* species including *H. purpurea* are commonly known as inkflowers, because upon drying, or as a result of handling or even the slightest bruising, the corolla lobes discolour to an ink-like black or purple (Trinder-Smith, 2003).

The specimen illustrated here by Vicki Thomas was found in December 2007 by Amida Johns while on an early morning run in the Kogelberg Biosphere Reserve situated about 60 km southeast of Cape Town, near the coastal town of Kleinmond. It was found growing next to a path that had recently been graded, and was parasitic on the roots of a small female shrub of *Leucadendron xanthoconus* (Kuntze) K. Schum. which is the dominant species in this part of the Reserve. Vicki Thomas reports that on receiving the news that the *Harveya* had been located and was in a fit state to be painted, she and her husband
rushed to the locality, where the plant and its host were carefully excavated. A notable observation made by her was that as a result of the excavation process, the roots of the Leucadendron began to dry out, resulting in it rapidly wilting on the way back to her studio in nearby Betty’s Bay and that simultaneously, the Harveya specimen that was still attached to its host wilted, but on being separated from the host and placed into water, it revived. She also observed that the Harveya attached itself to the tip of a root of the Leucadendron and not along the length of the root.

Cultivation. As far as I’m aware, no information exists in the literature on the successful cultivation of Harveya purpurea. However, Harveya squamosa (Thunb.) Steud., a very showy bright orange species endemic to the south-western part of the Western Cape, whose distribution is sympatric with that of H. purpurea, has been successfully ‘cultivated’, in a manner of speaking. In 1979, Prof. Niel du Plessis came across a group of H. squamosa in flower next to a woody species of Othonna, probably O. leptodactyla Harv. (Asteraceae) on a tract of land that was in need of conservation near Blouberg, just outside Cape Town. In due course he acquired the dried infructescences of the H. squamosa, and after separating a multitude of tiny dust-like seeds from the capsules, decided to sow them underneath three selected, mature bushes of Othonna coronopifolia L. in the nearby Cape Flats Nature Reserve, where, as far as was known, H. squamosa did not occur naturally. The seeds were sown there the following year in late April, coinciding with autumn rains. Visits to the three shrubs over two ensuing years revealed nothing, and he subsequently lost interest in establishing the species at that locality. Then in 1983, while walking in the Reserve during October, he decided on impulse to inspect the three shrubs, and to his surprise and delight, found three well established colonies of the Harveya in full flower, each colony associated with one of the three chosen Othonna shrubs. In subsequent years the H. squamosa colonies continued to flower successfully, without any visible signs of deterioration in the host plants. The conclusion drawn from this experience was that if one were able to cultivate the host plant successfully in deep sandy soil similar to that in which H. squamosa grows naturally, then cultivation of this parasite (and perhaps H. purpurea as well) should prove fairly easy (Du Plessis, 1986).
**Harveya purpurea** (L.f.) Harvey subsp. *purpurea*, Genera of South African Plants: 249 (1838).


*Aulaya purpurea* (L.f.) Bentham in DC., Prodr. 10: 523 (1846).


**Description.** Winter-growing perennial holoparasite 150–350 mm high, living on roots of woody plants. Caudal leaves scale-like, rudimentary, cream-coloured and imbricate at base of scape and below ground level, greenish-brown, lanceolate and silky-hairy above ground level, ovate or lanceolate, 5–15 × 2–5 mm. Scape rigid, unbranched, erect or suberect, reddish-brown or greenish-brown, silky hairy, 80–250 mm long. Inflorescence a terminal raceme, solitary or produced in clusters of up to 12 scapes; pedicels suberect, greenish-brown, silky-hairy, 8–10 mm long. Flowers 3–10, large and showy with a sweet, fruity scent, zygomorphic, funnel-shaped, spreading or suberect, solitary in axils of leaf scales; calyx campanulate, deeply five-lobed, purplish-brown to greenish-brown, lobes lanceolate, densely silky-hairy, 12–20 × 2–5 mm; corolla tube broad, slightly curved, light pink, yellowish-white or light purplish-yellow, 25 mm long; petal lobes five, ovate or obovate, more or less equal, margins ciliate, bilabiate with two upper and three lower lobes, spreading, soft, often with heavily undulate margins, purple or light to deep pink, with a large bright yellow marking in the throat, rapidly turning black on bruising or drying, upper lobes covered by front lobes when in bud, 10–15 × 15–20 mm. Stamens 4, linear, inserted in corolla tube at point of widening, included, filaments pubescent, two long filaments 15–20 mm long, two short filaments 10 mm long, anthers two-chambered, one fertile, one smaller and sterile, fertile chamber 2–4 × 2–3 mm with a small hooked spur at apex, sterile chamber 4–7 × 1–2 mm, apex acute. Ovary superior, globose, bilocular, greenish-yellow, 3–5 × 3–6 mm; style erect, included, white, uppermost portion strongly hooked just below stigma, 25–35 mm long; stigma clavate, included, 2–3 × 2–3 mm. Fruit a dehiscent, unilocular capsule, only opening partially, 8–10 × 7–8 mm. Seeds minute, multitudinous, brown, oblong.

**Distribution.** North-western part of the Western Cape to the eastern part of the Eastern Cape, South Africa.

**Habitat.** Sheltered places, mainly in fynbos on acid sandy flats and lower mountain slopes, occasionally in heavier soils in renosterveld, sometimes flowering in large numbers, in full sun or semi-shade.

**Flowering time.** September to January, with a peak period in November.

**References**


