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SUMMARY

Systematics of *Hypoxis* (Hypoxidaceae) in southern Africa

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Hypoxis is a genus of about 70 species found in the warmer parts of all continents except Europe. About 50 species occur in Africa, with the core diversity in the eastern region of South Africa. It is difficult to draw up a practical key to species due to the high level of polymorphism in the genus caused by hybridization and apomixis that give rise to polyploids. The forms derived through these genetic mechanisms end up with characters that do correspond with the parent species, and this affects species limits. Further, the appearance of plants changes when the leaves develop. This work presents a systematic account of *Hypoxis* in the Flora of southern Africa region (South Africa, Swaziland, Lesotho, Namibia and Botswana). It focuses on providing a revision of the genus based on morphological data accumulated from extensive field and herbarium studies. Growth form, leaf shape, distribution and type of hairs on leaves, inflorescence type, flower colour and ratio of floral dimensions were found to be important diagnostic characters for the genus. By applying these characters, 28 species and 5 varieties are recognised in southern Africa, all with yellow flowers except for two species and one variety in which the flower colour is white. The revision includes notes on diagnostic characters and relationships, distribution and ecology, etymology and common English, Afrikaans, Zulu and Xhosa names, for each taxon. In being data deficient, eight species remain unresolved.

Also, in this work, leaf anatomy, seed micromorphology and preliminary phytochemistry of *Hypoxis* were investigated and data from these disciplines were used to augment the species relationships inferred from morphology. Further, an assessment of the phytogeography of the genus is presented. Within southern Africa, three species occur in Namibia and two species in Botswana. The rest of the species are concentrated in South Africa, Swaziland and Lesotho and species richness is greatest in grasslands of the summer rainfall region. Species have either a wide or narrow range of distribution. Distribution ranges are integrated into the key especially for species with very a narrow range, to assist with identification.

A few members of the southern African *Hypoxis* are of economic importance. One species in particular, *H. hemerocallidea* (earlier name *H. rooperi*) commonly known as the 'African potato' has become a popular medicinal plant in South Africa. The rhizomes of the species are a rich source of hypoxoside, a phenolic glycoside that hydrolyses to form its aglycone called rooperol which has been shown to be active in destroying some cancer cells. *H. hemerocallidea* is also the plant from which the properties of sterols and sterolins were correlated with enhancing the human immune system. The genus therefore has potential for treating patients with auto-immune diseases such as rheumatoid arthritis, cancer and possibly HIV and AIDS.

The main output of this study is the taxonomic treatment that enables users to determine accurate names of species, their relationships and distribution in the Flora of southern Africa region. It should be useful to botanists, pharmacologists, chemists and horticulturalists.

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Curriculum Vitae

The degree PhD Yashica Singh

Yashica Singh completed her undergraduate and honours degrees at the University of Durban-Westville (now University of KwaZulu-Natal), and a higher degree in Education through the University of South Africa. She holds an MSc from the University of Pretoria, in which she examined the taxonomy of the economically important, South African endemic genus *Zantedeschia* (Araceae). Yashica is the Curator of the SANBI KwaZulu-Natal Herbarium in Durban. Over the past 14 years her contribution to plant systematics was focussed on the families Araceae and Hypoxidaceae in the Flora of southern Africa region. She has undertaken extensive field studies on *Zantedechia* and *Hypoxis* throughout South Africa, and is the author or co-author of several scientific and popular publications. She is co-editor of the book, 'Rebirth of Science in Africa: a shared vision for life and environmental sciences'. Yashica served as the secretary of the local Committee for the South African Association of Botanists, and as a member on the South African National Committee of the International Union of Biological Sciences.

In her thesis, **Systematics of *Hypoxis* (Hypoxidaceae) in southern Africa**, the promovenda re-evaluated the classification of *Hypoxis*, a group of flowering plants mainly confined to grassland. Commonly known as African potatoes or yellow stars, some members are of considerable importance in traditional medicine. Twenty eight species have been identified, making southern Africa the most species rich region for the genus world-wide. Seed micromorphology is shown to be particularly useful for classification purposes. The identities of several previously poorly understood taxa have been clarified, resulting in a considerable improvement of the classification of the group.

Promoter : Prof. Dr. A.E. van Wyk
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