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The WRC operates in terms of the Water Research Act (Act 34 of 1971) and its mandate is to support water research and development as well as the building of a sustainable water research capacity in South Africa.

TECHNICAL BRIEF

Aquatic ecosystems

Distribution, use and ecological roles of medicinal plants confined to wetlands

The WRC funded a study to improve our understanding of medicinal plants growing in freshwater ecosystems in South Africa.

Introduction

The use of plants for medicinal purposes is an inextricable part of South Africa's culture. An estimated 30 million people make regular use of the services of the country's 200 000 traditional healthcare practitioners, all of which apply indigenous and exotic plants in their remedies. This does not include the people who purchase medicinal plants from mostly informal markets. It has been estimated that the annual local trade in medicinal plants amounts to 20 000 t, representing 574 species.

While the properties and uses of medicinal plants have been well researched in South Africa, their natural habitats and the roles these plants play within these habitats are less well studied.

WRC study

The WRC consequently funded a study focused on building knowledge around the country's freshwater medicinal plants, i.e. those plants found in freshwater areas, such as wetlands and alongside rivers. The project specifically investigated the distribution, propagation, ecological role and use of these plants. Researchers also sought to assess to what extent current national legislation can be used for the protection of freshwater medicinal plants.

Perenial herb, Chironis palustris.

It is also suspected that many of these plants have a symbiotic relationship with certain fungi in the soil that ensures their survival as well as their propagation in nature. An example of the latter is ground orchids. This has the implication that these plants will only be propagated outside of their natural habitats with great difficulty. Their sustainable use and protection is therefore of particular importance.

Freshwater ecosystems differ greatly from one another depending on type, location, and climate, but they nevertheless share important features. In addition, because freshwater ecosystems are dynamic, they all require a range of natural variation or disturbance to maintain viability or resilience. Water flows that vary both season-to-season and year-to-year, for example, are needed to support plant and animal communities and maintain natural habitat dynamics that support production and survival of species.

Variability in the timing and rate of water flow strongly influence the sizes of plant and animal populations and their age structures, the presence of rare or highly specialised species, the interactions of species with each other and their environments, and many more ecosystem processes. This spatial and temporal variability ensures the species richness of these habitats.

Unfortunately, most of the country's freshwater systems have to endure circumstances far beyond their resilience capabilities. Far-reaching destruction of the country's wetlands has

occurred as a result of mining, agriculture and urban developments, while in-stream developments, pollution and riparian damage threaten the country's rivers.

Main results

The team discovered and consequently listed 230 medicinal plants occurring in South Africa's freshwater ecosystems. This list includes many of the most important medicinal plants for local communities. The plants were grouped into the following plant types: annual herbs, aquatic (submerged and free floating) plants, ferns, geophytes, grasses, perennial herbs, sedges, shrubs and trees. The perennial herbs were found to be the most utilised plant type followed by trees, geophytes and shrubs.

Apart from their medicinal properties, these plants were found to play an important role in their respective habitats, from acting as bank and soil stabilisers, to helping to improve water quality and retain floods and to playing a role in species diversity support (for example, as a food source or as nesting material used by animals and birds).

Because of the inter-connectedness of the different components of freshwater ecosystems, interference with one component, i.e. the harvesting of medicinal plants, can affect the functioning of the other components.

While some medicinal plants, like perennial herbs, can be propagated within a year or two, growing trees can be difficult, taking up to 15 years. It is suggested that in cases where medicinal plants are difficult to propagate, or raw material becomes scarce, alternatives should be investigated.

Unfortunately, the team found that medicinal plants are currently harvested at unsustainable rates in the wild. In fact, some important plant species are already considered extinct outside protected areas. In KwaZulu-Natal, for example, the wild ginger (***Siphonochilus aethiopicus***), the pepper bark tree (***Warburgia salutaris***) and the black stinkwood (***Ocotea bullata***) are no longer found outside reserves and parks.

To ensure long-term sustainable utilisation, wild populations of medicinal plants will have to be protected. One way to achieve this is to establish holding nurseries on a regional scale where local traditional health practitioners and plant gatherers can obtain stock that they can propagate themselves. Emphasis should be placed on the training of traditional health practitioners and plant gatherers to enable them to propagate their own medicinal plants.

Further reading:
To order the report, *Distribution, use and ecological roles of the medicinal plants confined to freshwater ecosystems in South Africa* (**Report No. KV 300/12**) contact Publications at Tel: (012) 330-0340, Email: orders@wrc.org.za, or Visit: www.wrc.org.za to download a free copy.