Destruction of nature's chemist – RESEARCHERS URGE FOR ACTION

Courtesy: Johan Wentzel

Persistent overharvesting of South Africa's plants for medicinal purposes as well the destruction of the habitats in which they are found could lead to millions of people losing access to their premier healthcare service. This is according to researchers who have completed a report for the Water Research Commission (WRC) on the distribution, use and ecological roles of medicinal plants in freshwater ecosystems. Article by Lani van Vuuren.

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. The WRC study, undertaken by independent researchers Dr Johan Wentzel and Carin van Ginkel, 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. The researchers also sought to assess to what extent current national legislation can be utilised for the protection of freshwater medicinal plants.

"While the freshwater ecosystems in which these plants occur are not defined by plants with medicinal properties, these medicinal plants still occupy a very specialised habitat, and it is important that this habitat be understood so that protection measures can be put in place so as to ensure their survival," write Dr Wentzel and Van Ginkel in their final report. "These ecosystems show great temporal and spatial variations and this ensures the variety and survival of these plants. Many of these plants are very habitat specific, such as certain ground orchids, pineapple lilies and red-hot pokers."

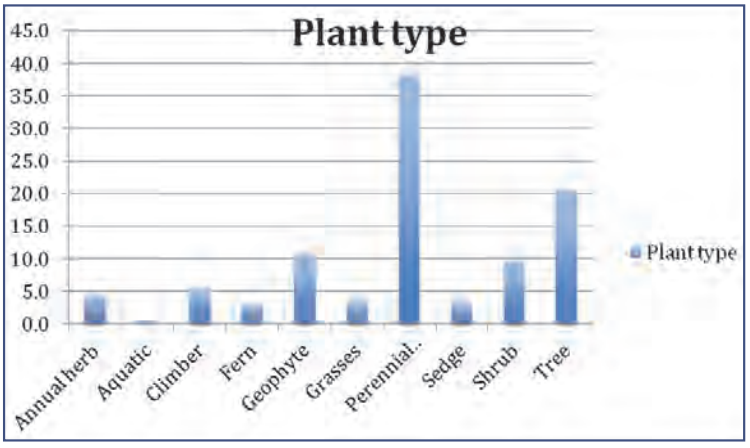
It is also suspected that many of these plants have a symbiotic relationship with certain fungi in the soil that ensures their survival as well as their propagation in nature. An example of the latter is ground orchids. This has the implication that these plants will only be propagated outside of their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

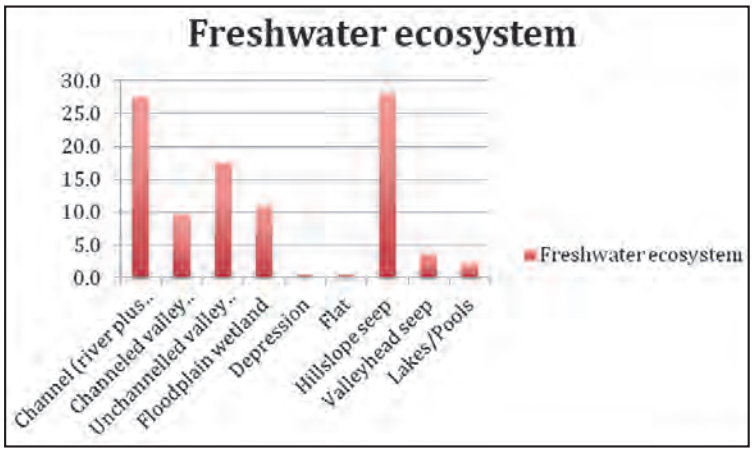
Freshwater ecosystems differ greatly from one another depending on type, location, and climate, but they nevertheless share important features. In addition, because freshwater ecosystems are dynamic, they all require a range of natural variation or disturbance to maintain viability or resilience. Water 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.

Courtesy: Johan Wentzel

*The river pumpkin, or wild rhubarb (*Gunnera perpensa*), is generally found in marshy areas and along stream banks.*





***Top left:** Distribution of plant types across the spectrum of freshwater ecosystems. The most widely used plants are perennial herbs and trees.*

***Bottom left:** Plant distribution as per freshwater ecosystem.*

***Picture left:** Wild spearmint (*Mentha longifolia*) is traditionally used to treat many ailments, from headaches and stomach pains to epilepsy and insomnia.*

Courtesy: Johan Wentzel

Brunsvigia natalensis *(Natal candelabra flower) flowering in a wetland near Badplaas, Mpumalanga.*

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.

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 groups 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).

Dr Wentzel and Van Ginkel point out that it is important to link the occurrence of medicinal plants to habitat and role. "If this is understood better, propagation requirements as well as resilience to change in the habitat can be assessed." They also recommend that the ecological role that medicinal plants play within a particular habitat need to be quantified. Since most medicinal plants only occur in small numbers and low concentrations, it is important to understand the ecological niche that these plants occupy.

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, the researchers say. "Proper management is therefore needed to ensure the sustainability of the freshwater system as well as the sustainable use of the medicinal plants."

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. The researchers suggest 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.

"The true traditional healer understands ecology and will never overharvest," Dr Wentzel points out. "Unfortunately, many people now harvest plants indiscriminately as a source of income. While, legally many of these plants are protected and may not be removed from the wild, the spatial extent on which this activity is taking place makes it impossible to enforce legislation in this regard."

Since it is understood that the use of medicinal plants make up an important part of African culture, authorities often turn a blind eye to overharvesting. "What is not realised is the extensive damage already caused to wild populations," notes Dr Wentzel.

To ensure long-term sustainable utilisation, wild populations of medicinal plants will have to be

Courtesy: Johan Wentzel

Hillslope seep in the Verlorenvallei Nature Reserve outside Dullstroom, Mpumalanga. This habitat is one of the most diverse concerning the occurrence of medicinal plants.

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; Fax: (012) 331-2565; Email: orders@wrc.org.za or Visit: www.wrc.org.za to download a free copy.

Courtesy: Johan Wentzel

Chironia palustris *is a perennial herb traditionally used to treat diarrhoea and colic in children.*

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.

The researchers conclude: "It must be accepted that the use of plants for medicinal purposes is ingrained in the fabric of our society. What is needed is the assurance that future generations will still be able to reap the benefits that nature provides." ❑