

Quest for the Grassland Jewels

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Summary

The Ornamental Horticulture programme group, Department of Environmental Sciences, UNISA, identified the need to recognize plant species of the Highveld region with ornamental, medicinal and eco-friendly landscape value for propagation and cultivation. According to the World Wild life fund 2020 the status of the Highveld grasslands is critical endangered due to severe agricultural fragmentation and urbanisation. These factors as well as climate change and extreme weather phenomena necessitate to be proactive in the identification and propagation of plant species best suited and resilient to extreme climate conditions. Not only to full fill the demands and needs of the green industry but also for the preservation of biodiversity.

Many of these resilient characteristics already exhibited by many plant species of the grassland biome.

By making use of structured questionnaires and pilot studies, public inputs will be obtained to determine which plants are selected and preferred by the public and why. Results obtained will provide guidelines of which plants to consider for propagation and cultivation. The distribution and availability of selected plant material for propagation will also be investigated.

This is an umbrella project consisting of several individual MSc and PhD research projects investigating the propagation and cultivation of grassland plant species. Results will be compiled into an extensive volume on the propagation of Highveld grassland plant species.

INTRODUCTION

South Africa is the third most biodiverse country in the world, containing 10% of the worlds' floral biodiversity. Consisting of approximately 23 000 plant species, attributed to both a diverse climate and landscape (Koekemoer *et al.*, 2013, Van Wyk & Gericke, 2000). The grassland biome is the second largest biome in South Africa comprising 24,27 % of South Africa's surface (Palmer & Ainslie, 2005). The Highveld region contains more or less 3 370 plant species (Bond, 2016) of which only 250 are known to be cultivated commercially for ornamental and landscape use (Wentzel, 2019).

Many indigenous plant species found in the grassland biome are adapted and resilient to extreme weather conditions experienced in this summer rainfall area that encounters major changes in rainfall (400 – 900mm) and seasonal temperature (-11°C winter to 38°C summer) as well as large differences in daily temperatures (3-6°C - 21-24°C) (Bowie & Frank, 2020; Mucina & Rutherford 2006). Making them excellent plant specimens for eco-friendly gardening and landscaping, especially in Gauteng. The Highveld Grassland has suffered extensive degradation due to agricultural fragmentation as it is one of the best areas for farming practises (Bowie & Frank, 2020). It is also the most densely populated biome in South Africa containing, Gauteng Province, the economic hub of South Africa. Expanding human populations, urbanisation, diminishing natural habitats, over exploitation and unsustainable harvesting practises threatens the survival of many grassland plant species as

well as the occurrence of invasive plant species competing with indigenous species for habitat and resources (Bowie & Frank, 2020).

The identification of grassland species with ornamental, medicinal and eco-friendly landscaping values need to be exploited to contribute to the survival of the species and maintenance of bio- and genetic diversity. Contributing to the economic growth of South Africa in creating job opportunities, export possibilities and research prosperities.

AIM AND OBJECTIVES

The aim of this project is to establish an Ornamental Horticulture research Group in the Department of Environmental Sciences at the University of South Africa for the propagation of indigenous plants occurring in the grassland biome with ornamental horticulture, medicinal and/or eco-friendly landscaping value.

Objectives of this project is to identify indigenous plant species with suitable characteristics and traits for ornamental horticultural and eco-friendly landscaping use as well as with medicinal value in the Highveld grassland. The investigation of optimal propagation methods and conditions for the cultivation of these identified plant species *via* cuttings, seeds or tissue culture. Ensure the survival of these species preserving biodiversity and possible commercialisation.

LITERATURE REVIEW

An extensive literature review was done on plants that occur in the grassland biome of South Africa, specifically the Gauteng region, comprising the Soweto Highveld Grassland (GM 8), Egoli Granite Grassland (GM 10) and the Rand Highveld Grassland (GM 11) (Mucina & Rutherford, 2006). Indigenous plant species characteristic of the grassland biome that exhibit desired traits for ornamental horticulture and eco-friendly landscaping was identified, being its structure, foliage or flower production, growth form or various other factors.

By making use of structured questionnaires, public inputs were obtained concerning plants selected by the public. Provided an indication of plants to consider for propagation.

Rothea hirsuta (Hochst.) R.Fern.

Family: Lamiaceae

Clematopsis scabiosifolia (DC.) Hutch.

Family: Ranunculaceae

Pachycarpus schinzianus (Schltr.) N.E.Br.

Family: Apocynaceae

Macledium zeyheri (Sond.) S.Ortiz

Family: Asteraceae

Dicoma anomala Sond. Family: Asteraceae

Pentanisia prunelloides (Klotzsch ex Eckl. & Zeyh.) Walp. Family: Rubiaceae

Boophone disticha (L.f.) Herb

Family: Amaryllidaceae

Chironia palustris Burch. subsp. *Palustris*

Family: *Gentianaceae*

Lannea edulis (Sond.) Engl. var. *edulis*

Family: Anacardiaceae

METHODOLOGY

Three grassland plant species were selected from the above initial plant list compiled for this pilot study to determine the public opinion. The pilot study was conducted by making use of questionnaires to determine the public opinion on which of the three-plant species selected and presented, they found the most attractive and would want to plant in their gardens and the reasons why.

Surveys

Surveys were done at various garden centres in the Johannesburg area and the SANA trade day by making use of face to face surveys. An e-mail survey was also sent to the IPPS SA members for participation. The face to face surveys were done on week days in the months of August and September 2019. A total of 55 completed surveys were obtained and the results analysed.

RESULTS

The results of the pilot survey indicated that most of the respondents interviewed was females (73%) under the age of 50 (67%). Most of them indicated that they are keen garden enthusiasts. When asked about gardening by only making use of indigenous plant species, exotic species or a mix of both indigenous and exotic species in the garden, most agreed that a mixture of indigenous and exotic plants can be used successfully in a garden. Seventy-four percent of the respondents was against a complete exotic garden whereas 50% agreed and strongly agreed that a garden should only contain indigenous species.

Fig. 1 indicates the respondent's responses concerning the various aspects of the different plants preferred. The leaves, flowers, fruit and growth form as well as the entire plant was evaluated. According to the results obtained the most prominent characteristics of

these species selected was their flowers and secondly the fruit, with the flowers of *C. scabiosifolia* the top selective and the fruit of *L. edulis* as the top fruit/seed selective.

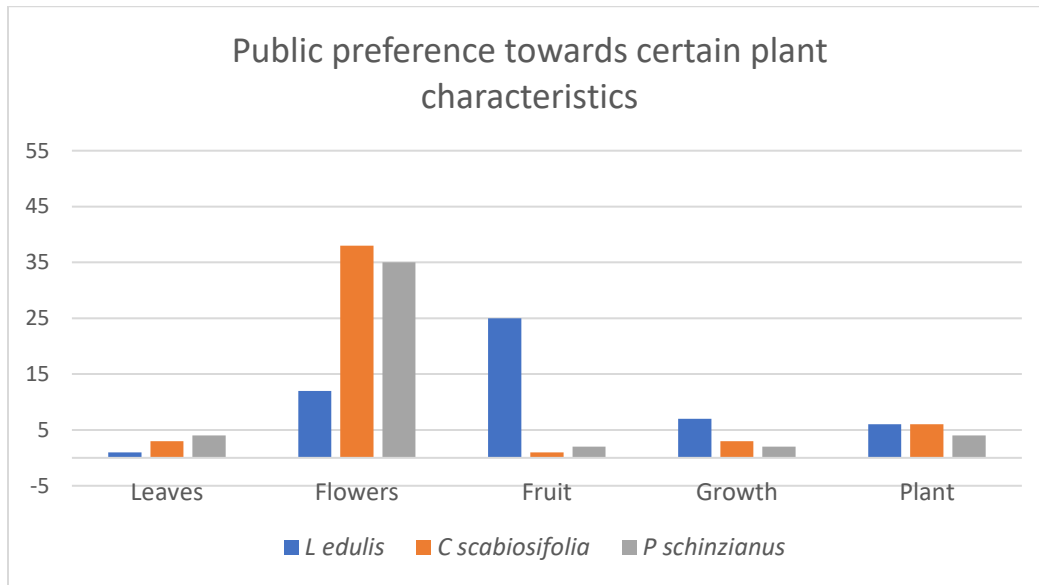


Figure 1. A graphical representation of the respondent's responses towards popular features

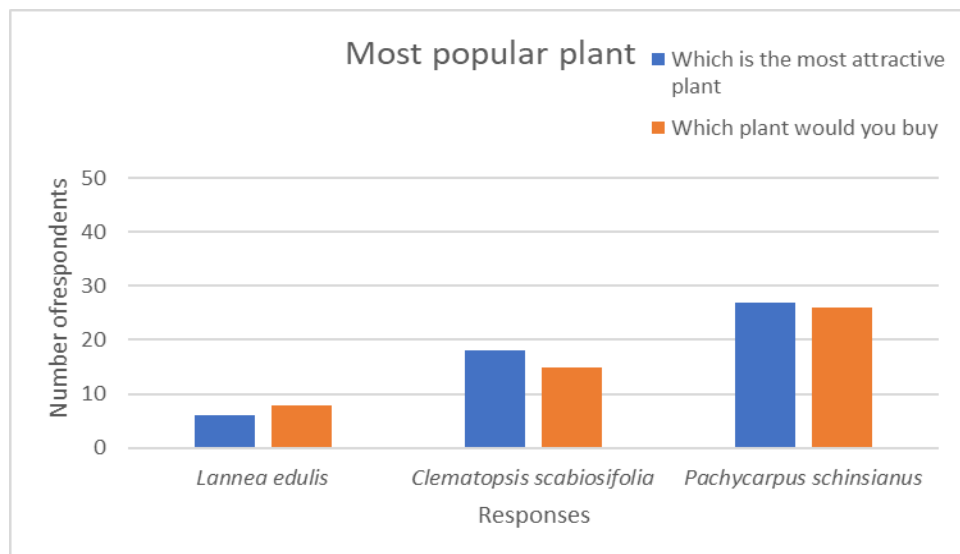


Figure 2. Graph indicating the plant species that the respondents found most attractive and the plant that they will most likely buy.

According to the results obtained the overall selection of the plant that the public would purchase and plant in their gardens was indicated as *P. schinsianus* (Fig. 2).

CONCLUSION

From the results obtained it is evident that it is necessary to proceed with a short pilot study to obtain the necessary feedback from the public concerning their preferences toward certain plant species and traits for cultivation before the actual cultivation and propagation research begin. These pilot studies

should be extended to more garden centres and more response should be obtained to enable a more comprehensive assumption of what is being preferred by the public. These pilot studies can also create an awareness with the public towards indigenous species found in the Highveld Grassland. This literature review also emphasised the urgency of this project as only 0,5% of the Highveld Grassland is being conserved and many potential ornamental horticulture and eco-landscape species can be lost for future generations if proactive measurements are not being implemented.

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