Bangladesh J. Bot. **49**(1): 117-124, 2020 (March)

PLANT SPECIES USED FOR BIRDLIME-MAKING IN SOUTH AFRICA

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Keywords: Birdlime-making plants, Indigenous knowledge, Soutpansberg, Vhavenda people, Vhembe Biosphere Reserve

Abstract

Plants used for making birdlime and indigenous knowledge associated with the practice in Soutpansberg region, Vhembe Biosphere Reserve, Limpopo province, South Africa have been documented. Twelve birdlime-making plant species belonging to Apocynaceae, Celastraceae, Euphorbiaceae, Loranthaceae, Moraceae and Sapotaceae families were recorded. The common species included *Maytenus peduncularis* (Sond.) Loyes cited by 23.6% informants, *Euphorbia pulvinata* Marloth (17.2%) and *Landolphia kirkii* Dyer (12%). Plant parts used were latex (50%), fruit (34%), root (8) and the mixture of latex and fruit (8%). Documentation of plant species used for birdlime-making is of great interest, not only for preservation of the Vhavenḓa's traditional culture, but also for promoting economic subsistence, nutritional value and livelihood amongst poor and marginalized people.

Introduction

Indigenous knowledge about plant uses and processing is considered to be prevailing, adaptive, accumulative and dynamic (Dold and Cocks 2000). This wealth of knowledge presents crucial economic opportunities and transformation to the rural and marginalized communities across the globe (Siyanbola *et al.* 2012). More than 70% of populations in developing countries across the globe, rely on plant derived resources for their livelihoods and economic development (Maroyi 2011), including birdlime-making, medicinal and socio-cultural activities.

Birdlime refers to the adhesive and sticky substance derived from various plant materials used for trapping small birds (Tarugarira 2012). It is usually derived from latex of various plant species (Platt *et al.* 2012). Birds trapping is mostly done to address challenges such as livelihood, subsistence, medicinal and religious purposes (Imchen and Joglekar 2015). In many aboriginal cultural communities, the culture of birdliming serves as an important source of nutritional value (Belda *et al.* 2012). Birdliming activities are also considered to be widespread practices, especially in aboriginal cultural communities (McCulloch *et al.* 1992). Making of birdlime has been a fundamental part of traditional culture for the Vhavenḓa people for many decades.

As like in any other tribes across the African continent, the Vhavenḓa tribe mainly acquired their knowledge about birdlime-making plant species orally, through the word of mouth and cultural transmission from one generation or lineage to another (Tolossa *et al.* 2013). Despite different lifestyles lead by rural South Africans, local people in the Soutpansberg region still use birdlime as part of their traditional culture. There is a need to document and disseminate African biodiversity as this is a fundamental source of livelihood and cultural development (Pakia *et al.* 2003). But there is a dearth of information on diversity, uses and conservation status of Soutpansberg biodiversity. Most research done so far on Soutpansberg biodiversity focused on

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medicinal plant species and their phytochemical properties used as herbal medicines (Mulaudzi *et al.* 2011, Magwede *et al*. 2014). However, there was no direct study focused on plant species used for birdlime-making in that region. The current study, therefore documented plants used for making birdlime and the indigenous knowledge associated with the practice in Soutpansberg Region, Vhembe Biosphere Reserve, Limpopo province, South Africa. The information about birdlime-making plant species is of great interest, not only for the preservation of cultural traditions (Belda *et al.* 2010), but also for the promotion of economic subsistence and nutritional value among poor and marginalized people.

Materials and Methods

The current study was undertaken in Kutama-Sinthumule and Nzhelele villages, in Soutpansberg Region, Vhembe Biosphere Reserve, Limpopo province, South Africa (Fig. 1). Kutama-Sinthumule is located in the western region of the Makhado local municipality within the coordinates ranging from 23º5′0.065" to 23º7′29.712"S, 29º39′58.989" to 29º 48′ 44.614"E whereas, the Nzhelele region is located on the eastern side of the same local municipality and its coordinates ranging from 22º52′43.006" to 22º55′32.995"S, 30º3′28.285" to 30º16′53.212"E (Fig. 1).

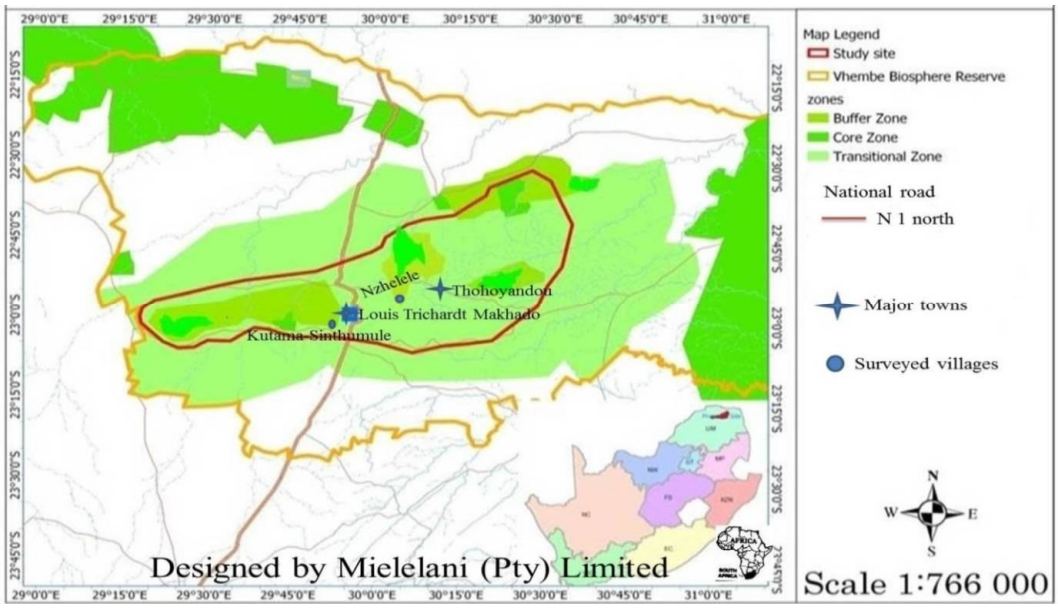

Fig. 1. Locality map of Soutpansberg.

The vegetation type within the study area is classified as bushveld of the savanna biome (Luseba and Tshisikhawe 2013). The climatic conditions of the study areas are characterized by warm-wet summer season (span from October to April) and mild-dry winter (May to September) (Gumbo *et al.* 2016). The regional mean annual rainfall ranged from 300 to 820 mm (Mpandeli 2014), with the highest rainfall received in summer season, while less rainfall is received during the winter season. The regional average annual temperatures range from 20 to 30ºC, with the highest temperature recorded in summer season (Mzezewa and Rensburg 2011).

Documentation of birdlime-making plant species used by the Vhavenda people in the Soutpansberg region was done through participatory rural appraisal (Chambers 1994), with the informants. This study was carried out in May, 2018 until the end of September, 2018. A total of 250 informants of various age groups were arbitrarily selected. Amongst the selected informants, there were 117 laypeople, subsistence farmers (50), herbalists (30), avifaunal hunters (34) and traditional healers (19) (Fig. 2).

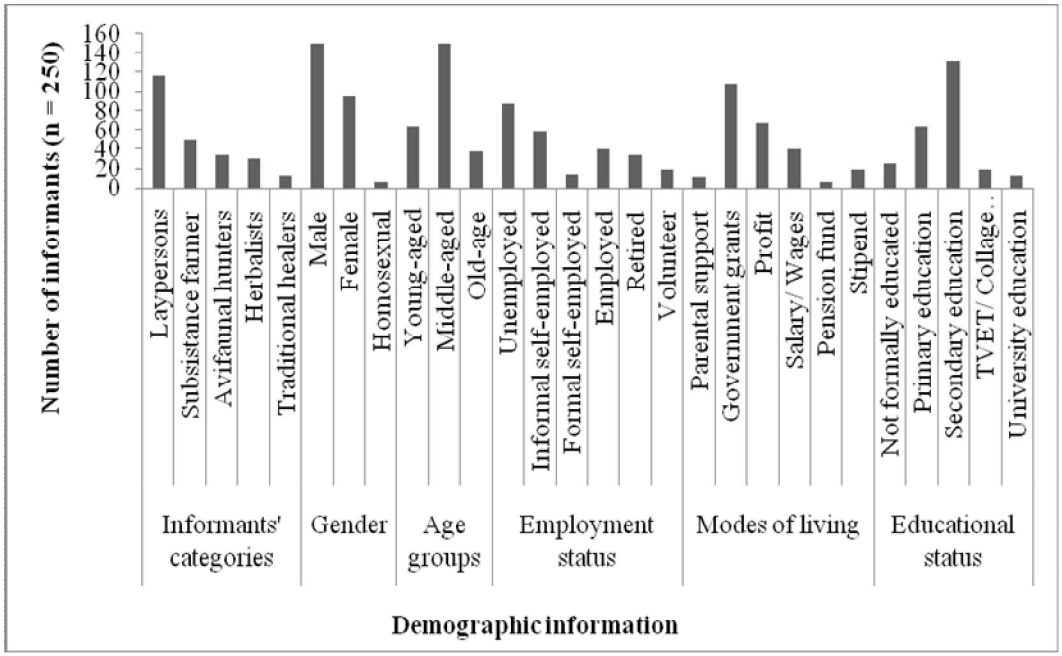

Fig. 2. Informants' biographical information.

All informants signed an informed consent form for participating in the current study, which was permitted by the University of Fort Hare Research Ethics Committee, reference number MAR031SRAM01. Information about the identities of birdlime-making plant species and traditional knowledge associated with the practice were obtained during the interview sessions with the informants using semi-structured and close-ended questionnaires (Mueller *et al.* 2010). To enhance the flow of ideas and participation confidence amongst the informants, interviews were carried out using local language of instruction (Tshivenda language). To avoid inconsistency and discrepancy in the administered questionnaires during the interview sessions, similar questions were administered to every informant. Field work was conducted to collect voucher specimens and validate the identities of plant species mentioned by the informants during interview sessions. The voucher collection permit was obtained from the Limpopo Department of Economic Development, Environment and Tourism, permit number: ZA/LP/92932. Data analysis was performed using Microsoft Office 2010 spreadsheet, descriptive statistical components such as, frequency of occurrence and percentage.

Results and Discussion

The total number of 12 birdlime-making plants belonging to 5 families were recorded. According to informants, the use of various plant species in the birdlime-making has been part of the Vhavenda people's indigenous conservation strategy to reduce harvesting pressure among useful species (Personnel communication with informants). This seemed to be certain since literature suggested that ethnobotanical use of diverse plant species demonstrates wisdom, dynamism and alternatives (Kunwar *et al.* 2015). Amongst the recorded families, Ephorbiaceae and Loranthaceae were the most frequently utilized families with 4 species each (Fig. 3). The frequent utilization of family Euphorbiaceae and Laranthaceae was underpinned due to factors such as distribution, species diversity within these families and their abundance in the study areas. Previous studies reported that Euphorbiaceae is a diverse and largest family within the flowering

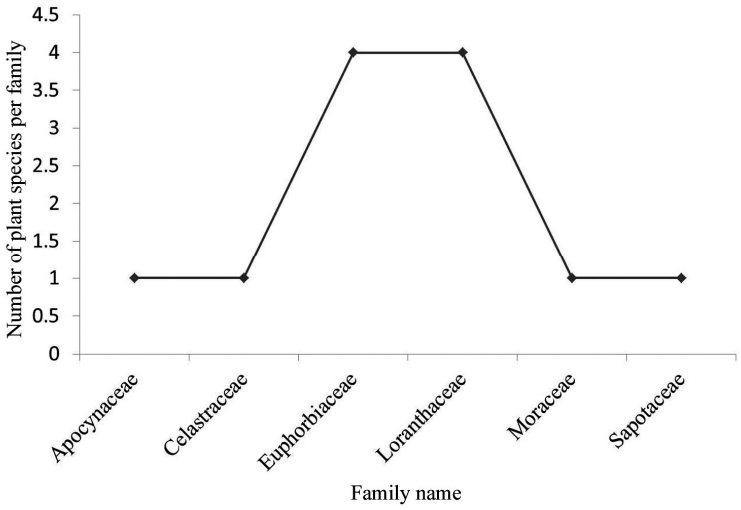

Fig. 3. Frequency of birdlime-making plant species per family.

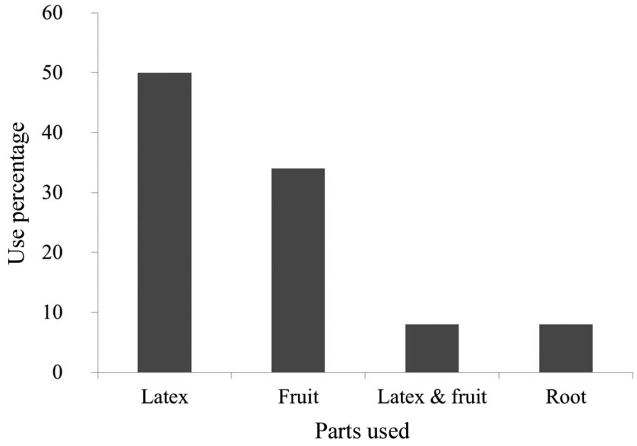

Fig. 4. Parts utilized.

Table 1. Inventory of birdlime-making plant species used by the Vhavenḓa people in the Soutpansberg, Vhembe Biosphere Reserve, Limpopo province, South Africa.

Family	Species	Vernacular name	Habit	Use	Parts	Preparation mode	Informants % level (n=250)	No. of same use citations	Voucher no.
Apocynaceae	*Landolphia kirkii* Dyer *ex* Hook.f.	Muvhungo (V), Rubber Vine (E)	Climber	BL	L& Fr	Latex is blown by air for about 30 minutes and the ripe fruit coat is crushed	12.0	4 (ABCD)	RAMLJ001
Celastraceae	*Maytenus peduncularis* (Sond.) Loes	Mukwatule (V), Indigenous Blackwood (E)	Tree	BL	R	Fresh root bark crushed or chewed	23.6	2 (AB)	RAMLJ002
Euphorbiaceae	*Euphorbia pulvinata* Marloth	Tshiḓitshinzhi (V), Pincushion Cactus (E)	Succulent	BL	L	Stirred while boiling for about 20 to 30 minutes	17.2	Non	RAMLJ003
Euphorbiaceae	*Synadenium cupulare* (Bioss.) L.C. Wheeler	Muswoswo (V), Crying tree (E)	Shrub	BL	L	Stirred while boiling in an opened space for about 30 to 45 min	3.6	1 (D)	RAMLJ004
Euphorbiaceae	*Euphorbia ingens* E.Mey. *ex* Boiss	Mukonde (V), Candelabra Tree (E)	Succulent	BL	L	Stirred while boiling in an opened space for about 30 to 45 min	2.0	2 (AB)	RAMLJ005
Euphorbiaceae	*Euphorbia tirucalli* L.	Muṱungu (V), Rubber tree (E)	Tree	BL	L	Stirred while boiling in an opened space for about 30 to 45 min	0.8	Non	RAMLJ006
Loranthaceae	*Erianthemum dregei* (Eckl. & Zeyh.) Tiegh	Tshilungwane (V), mistletoe (E)	Shrub	BL	Fr	Ripe fruits, crushed or chewed	8.8	2 (AB)	RAMLJ007
Loranthaceae	*Erianthemum ngamicum* (Sprague) Danser	Tshilungwane (V), Okavango mistletoe (E)	"	BL	Fr	Ripe fruits, crushed or chewed	7.2	Non	RAMLJ008
Loranthaceae	*Tapinanthus forbesii* (Sprague) Wiens	Makhuluwatshilungwane (V)	"	BL	Fr	Ripe fruits, crushed or chewed	8.0	Non	RAMLJ009
Loranthaceae	*Tapinanthus rubromarginatus* (Engl.) Danser.	Makhuluwatshilungwane (V), red mistletoe (E)	"	BL	Fr	Ripe fruits, crushed or chewed	7.2	Non	RAMLJ010
Moraceae	*Ficus thonningii* Blume	Moumo (V), common wild fig (E)	Tree	BL	L	Blown by air for an hour and more	6.0	2 (BF)	RAMLJ011
Sapotaceae	*Englerophytum magalismontanum* (Sond.) T.D.Penn.	Munombelo (V), milkplum (E)	Tree	BL	L	Blown by air for an hour and more	3.6	Non	RAMLJ012

A = Mabogo (1990), B = Magwede *et al.* (2019), BL = Birdlime, C = Constant and Tshisikhawe (2018), D = Pakia *et al.* (2003), F = Platt *et al.* (2012), L = Latex, L & Fr = Latex and fruits, Fr = Fruits, E = English name and V = Venda name).

plants and it contained over 2000 species (Ernst *et al.* 2015), whereas, family Loranthaceae is considered to have 950 species and 77 genera (Didier *et al.* 2009). Among the recorded species, 6 of them were reported for being used in the birdlime-making for the first time and this included *E. pulvinata* (17.2%), followed by *T. forbesii* (8%), *T. rubromarginatus* (7.2%), *E. ngamicum* (7.2%), *E. magalismon-tanum* (3.6%) and *E. tirucalli* (0.8%) (Table 1). High percentage level of informants who cited *M. peduncularis*, *E. pulvinata* and *L. kirkii* demonstrated the certainty of common knowledge associated with their uses in the study areas (Table 1). According to the informants, it is commonly known that birdlime derived from either *M. peduncularis* or *E. pulvinata* considered to be lasting, reliable and strong if subjected to the strengthening process using latex of *L. kirkii* (Personal communication). This was supported by Magwede *et al.* (2018), who demonstrated that *L. kirkii* plays a pivotal role in the birdlime strengthening. Fig. 4, represents the utilized parts of various birdlime-making plant species. Among these plant parts, latex was regularly utilized (50%), followed by fruit (34%), root (8%) and the combinations of latex and fruit (8) were equally utilized. The results of this study confoirm to the study done by Pakia *et al.* (2003). Although, indigenous knowledge about birdlime-making plant species seemed to be prevalent across the study areas (Fig. 5), instant transmogrified lifestyle tends to gradually erode this precious knowledge unnoticed. Mokganya *et al.* (2018), stated that urbanization and change in rural lifestyle can gradually erode local knowledge and traditional culture. Avifaunal hunters tend to have extensive knowledge of plants used for birdlime-making (Fig. 5). These results differ from the study done by Kayani *et al.* (2014), whereby laypeople were reported to have extensive knowledge about plant uses.

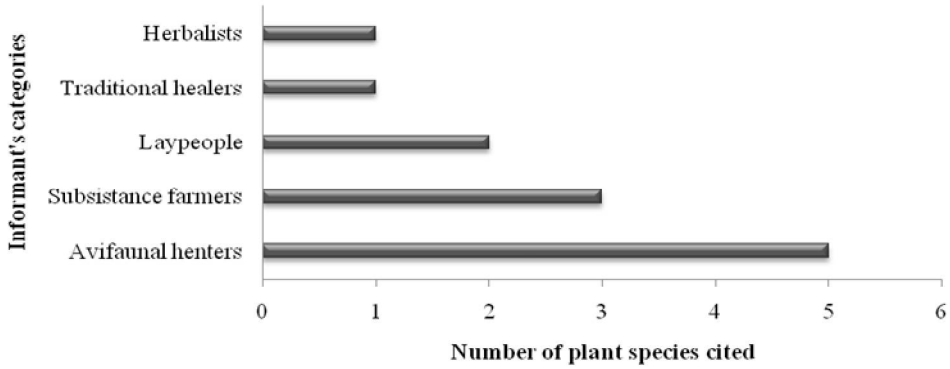

Fig. 5. Number of plant species cited per informant category.

The documentation of plant species used for birdlime-making is of great interest, not only for the preservation of traditional culture, but also for promoting economic subsistence, nutritional value and livelihood amongst poor and marginalized people. Plant species used by the Vhavenḓa people for making birdlime in Soutpansberg rRegion, Vhembe Biosphere Reserve, Limpopo province, South Africa yet to be fully understood. This study focused on documenting plant species used for birdlime-making by the Vhavenḓa people only, leaving the nutritional value and economic implications derived from birdlime-making untapped. Therefore, further studies about rural nutritional value and economic implications derived from birdliming practice are warranted. This could bring many rural communities countrywide and across the globe to the spotlight to completely understand the benefits derived from birdliming practice.

Acknowledgements

This study was subsidized by the National Research Foundation (NRF) of South Africa, the University of Fort Hare (NRF Grant No. 112976), University of Venda and Green Empire for Biodiversity and Environmental Health Consultancy (Pty) Limited. The authors would profoundly like to thank all informants who took part in this study, including the traditional leadership (in Nzhelele and Kutama-Sinthumule Villages), who permitted the commencement of this study in their areas of jurisdiction.

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(Manuscript received on 11 December, 2018; revised on 6 June, 2019)