PLANT SPECIES USED FOR BIRDLIME-MAKING IN SOUTH AFRICA

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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 kirki 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 Vhavenda'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 Vhavenda people for many decades.

As like in any other tribes across the African continent, the Vhavenda 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 23°5’0.065” to 23°7’29.712”S, 29°39’58.989” to 29° 48’ 44.614”E whereas, the Nzhelele region is located on the eastern side of the same local municipality and its coordinates ranging from 22°52’43.006” to 22°55’32.995”S, 30°3’28.285” to 30°16’53.212”E (Fig. 1).

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 30°C, 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).

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 Loranthaceae 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.](image1)

![Fig. 4. Parts utilized.](image2)
Table 1. Inventory of birdlime-making plant species used by the Vhavu̱nja 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            | Tshiifishinzhi (V), Pincushion Cactus (E) | Succulent| BL | L    | Stirred while boiling for about 20 to 30 minutes                               | 17.2                        | Non                       | RAMLJ003     |
| Euphorbiaceae   | Synadenium cupulare (Bios.) L.C. Wheeler | Maworworo (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 Boissi      | Mukonde (V), Candéabra 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.                 | Mutungu (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    | Eriathemum dregi (Eckl. & Zeyh.) Tiegh | Tshilingwane (V), mistletoe (E)  | Shrub  | BL   | Fr   | Ripe fruits, crushed or chewed                                                 | 8.8                         | 2 (AB)                    | RAMLJ007     |
| Loranthaceae    | Eriathemum olympicum (Sprague) Danser  | Tshilingwane (V), Okavango mistletoe (E) | "      | BL   | Fr   | Ripe fruits, crushed or chewed                                                 | 7.2                         | Non                       | RAMLJ008     |
| Loranthaceae    | Tapinanthus forbesii (Sprague) Wiens   | Makululunthshilingwane (V)       | "      | BL   | Fr   | Ripe fruits, crushed or chewed                                                 | 8.0                         | Non                       | RAMLJ009     |
| Loranthaceae    | Tapinanthus rubromarginates (Engl.) Danser | Makululunthshilingwane (V), red mistletoe (E) | "      | BL   | Fr   | Ripe fruits, crushed or chewed                                                 | 7.2                         | Non                       | RAMLJ010     |
| Moraceae        | Ficus thomningi Blame                  | Mounou (V), commor wild fig (E)  | Tree   | BL   | L    | Blown by air for an hour and more                                               | 6.0                         | 2 (BF)                    | RAMLJ011     |
| Sapotaceae      | Englerophyton magalisonianum (Sond.) T.D.Penn | Munombelo (V), milliplum (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 Tshinikha (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. magalismom-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 conform 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 Vhavēnda people for making birdlime in Soutpansberg Region, 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 Vhavēnda 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.
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