

Full length Research paper

The first 31 medicinal plant species prioritized for conservation and sustainable utilization at Fedis and Midega districts of Oromiya regional state, Ethiopia.

Abebe Worku, Naol Bayu, and Ashenafi Teshager

Ethiopian Biodiversity Institute, Harar Biodiversity Center, Pobox 1121, Harar, Ethiopia

Accepted 24 July, 2020

This study was carried out to document medicinal plant species prioritized for conservation and sustainable utilization based on the indigenous knowledge among the traditional healers of Fedis and Midega districts of Oromiya regional state, East Ethiopia. 12 traditional healers were selected from the study area and given duty to rank the medicinal plant species based on the medicinal value and vulnerability in the surrounding source. The ranks given by all of the traditional healers were averaged by Microsoft excel for the 31 medicinal plant species to decide the average ranks of each of the medicinal plant species. *Trema orientalis*, *Solanecio angulatus*, *Cissampelos mucronata*, *Jasmin grandiflorum*, *Aloe calidophylla*, *Cucumis dipsaceus*, *Withania somnifera*, *Cymbopogon citrate*, *Polygala sphenoptera*, *Cardus macracanthus*, *Tamarindus indica*, *Acacia brevispica*, *Punica granatum*, *Impatiens rothi*, *Berchemia discolor*, *Kalanchoe quartiniana*, *Vernonia amygdalina*, *Cassipourea malosana*, *Croton macrostachys*, *Balanites aegyptiaca*, *Ziziphus spina-christi*, *Doviyalis abyssinica*, *Erythrina brucei*, *Olea europea sub.sp. cuspidate*, *Commicarpus africanus*, *Diospyros abyssinica*, *Steganotaenia araliacea*, *Artemisia absinthium*, *Rubus apetalus*, *Senna Italica*, and *Cucumis ficifolius* were the first 31 medicinal plant species in that order which were prioritized by the traditional healers. The study showed that these 31 medicinal plant species are threatened in their wild habitat. Therefore special attention must be given to these species when responsible body performs the task of conservation and sustainable utilization of plant species in the study area.

Key words: Indigenous knowledge, traditional healers, medicinal plant, Fedis district, Midega district, rank, Prioritized, Ethiopia

INTRODUCTION

The practice of using TM as a solution for human and livestock ailments is popular in the developing world and it is rapidly spreading in the developed nations as well. Literatures indicate that 30–50% of the total drug consumption in China arise from traditional herbal preparations. In African countries like Ghana, Mali, Nigeria and Zambia, the first choice for 60% of children with high fever resulting from malaria is the use of herbal medicines. Similarly, in Ethiopia up to 80% of the population uses TM for preventive or curative purposes against human and livestock health problems (Kebede *et*

al., 2006; Abebe and Hagos, 1991 and Regassa, 2013). In addition, traditional medicines already comprise a multi-billion dollar, international industry, and the biomedical sector is increasingly investigating the potential of genetic resources and traditional knowledge (Jing-Ming, *et al.*, 2003). So far, 887 to 1000 medicinal plant species are reported in the Ethiopian Flora (Bekele, 2007).

Plants have played crucial role as a source of traditional medicine in Ethiopia from the time immemorial to combat different ailments of human sufferings (Dawit, 1999). It was the only system available for healthcare prior to the introduction of modern medicine for prevention, diagnosis and treatment of social, mental and physical illness (Dawit, 1986). To date traditional medicine has become an integral part of the culture of the

*Corresponding Author's E-mail: abebe21w@gmail.com

Ethiopian people due to its long period of practice and existence (Mirgissa, 1998). Due to acceptability, accessibility and biomedical benefits there is a large magnitude of use and interest of medicinal plants in Ethiopia (Dawit, 1998).

The long history of use of medicinal plants in Ethiopia is reflected in various medico-religious manuscripts produced on parchments and believes to have originated several centuries ago (Kibebew, 1998).

Reviews of medical textbooks that have been written in Geez or Arabic between 17th and 18th centuries indicated that the majority of Ethiopians, with the exception of a few privileged groups, starting from the time of the Italian occupation, have been depending almost entirely on the traditional medicine (Punkhurst, 1990).

Moreover, Ethiopia is home for more than 80 ethnic groups with a diversified culture which reflected in enormous traditional knowledge on use of herbal for medicine and associated knowledge (Agisho *et al.*, 2014; Zenebe *et al.*, 2012 and Belayneh *et al.*, 2012).

Ethiopia is increasingly making efforts to protect their genetic resources and TM knowledge through conservation and national legislation for benefit sharing. Furthermore, considerable number of assessments are being done at various localities of the country to document indigenous knowledge and medicinal plant species (Mahmud and Gairola, 2013, Agisho *et al.*, 2014; Zenebe *et al.*, 2012 and Belayneh *et al.*, 2012, Yeneayehu *et al.*, 2016, Abebe, 2017). However, little has been done to prioritize the medicinal plant species for conservation and sustainable utilization.

Therefore, there is an urgent need to perform prioritization activity based on the medicinal values as well as the vulnerability of the species in the wild habitat.

Various studies indicated that local experiences which have been gained through generation to solve indigenous problems are disappearing due to lack of written documents, death of elders, migration of people due to drought and social problems, urbanization, influence of modern medicine and exotic cultures.

As a result, many plant species have become extinct and some are endangered and many are not yet identified (Agisho *et al.*, 2014 and Bekele, 2007).

Particularly, the home range of the elephants in the Babile Elephant Sanctuary has shrunk by about 65.5% since 1976 due to mass influx of a large number of farmers and their domestic stocks from the east and north (Demeke *et al.*, 2006).

Apart from collecting and documentation of indigenous

traditional medicine prioritizing them is now important than ever to preserve associated knowledge and medicinal plant biodiversity in order to assist modern drug improvement.

Therefore, the aim of this study was to prioritize and ranking the previously identified medicinal plant species for the future conservation and sustainable utilization in six kebeles of Fedis and Midega districts adjacent to the Babile Elephant Sanctuary, East Ethiopia.

MATERIALS AND METHODS

Study Area Description

The study was conducted in six kebeles of Fedis and Midega Tolla districts namely Agudora, Rizki, and Anani of Fedis and Muditola, Lenca, and Kirensa of Midega district in Oromiya regional state at Eastern Hararge zone, eastern Ethiopia (Figure 1).

Fedis district is located at about 549 km east of Addis Ababa and 24 km north of Harar city. Midega Tolla district is also at 607 km east of Addis Ababa and 58 km north of Harar city. Both Midega tolla and Fedis districts consists of 19 rural kebeles.

Fedis has 2 urban villages whereas Midega do have only 1 urban village. Geographically, the area is located between 8.022 to 9.014 N and 42.062 to 42.019 E with an altitude ranging from 1200 - 2118 m.a.s.l.

Fedis district covers a total surface area of 1,105 km² whereas Midega tolla covers 1,732.53 km². The area is characterized by the presence of various soil types including red-brown and black that is clay-loam (80%), clay (15%) and sandy-loam (5%) and it has high fertility and water holding capacity.

The study area is bordered on the east by Babille, on the west by Girawa, on the northwest by Haromaya and kurfa chele, on the north by the Harari Region, on south by Somale region, and on south east by Meyu mulukie district of East Hararghea Zone. The administrative center of Fedis and Midega tolla woredas are Boko and Midega, respectively.

The temperature of the study area ranges from 25 - 30°C. It rains twice a year with an average annual rainfall of 650 – 900 mm. According to the projection made from 2007 population and housing census, the 2012 total populations of Fedis district are about 130,344 of which 64,368 are females and the population of Midega is 123,807 of which 60,196 are female.

The majority of the inhabitants (99.22%) are Muslim.

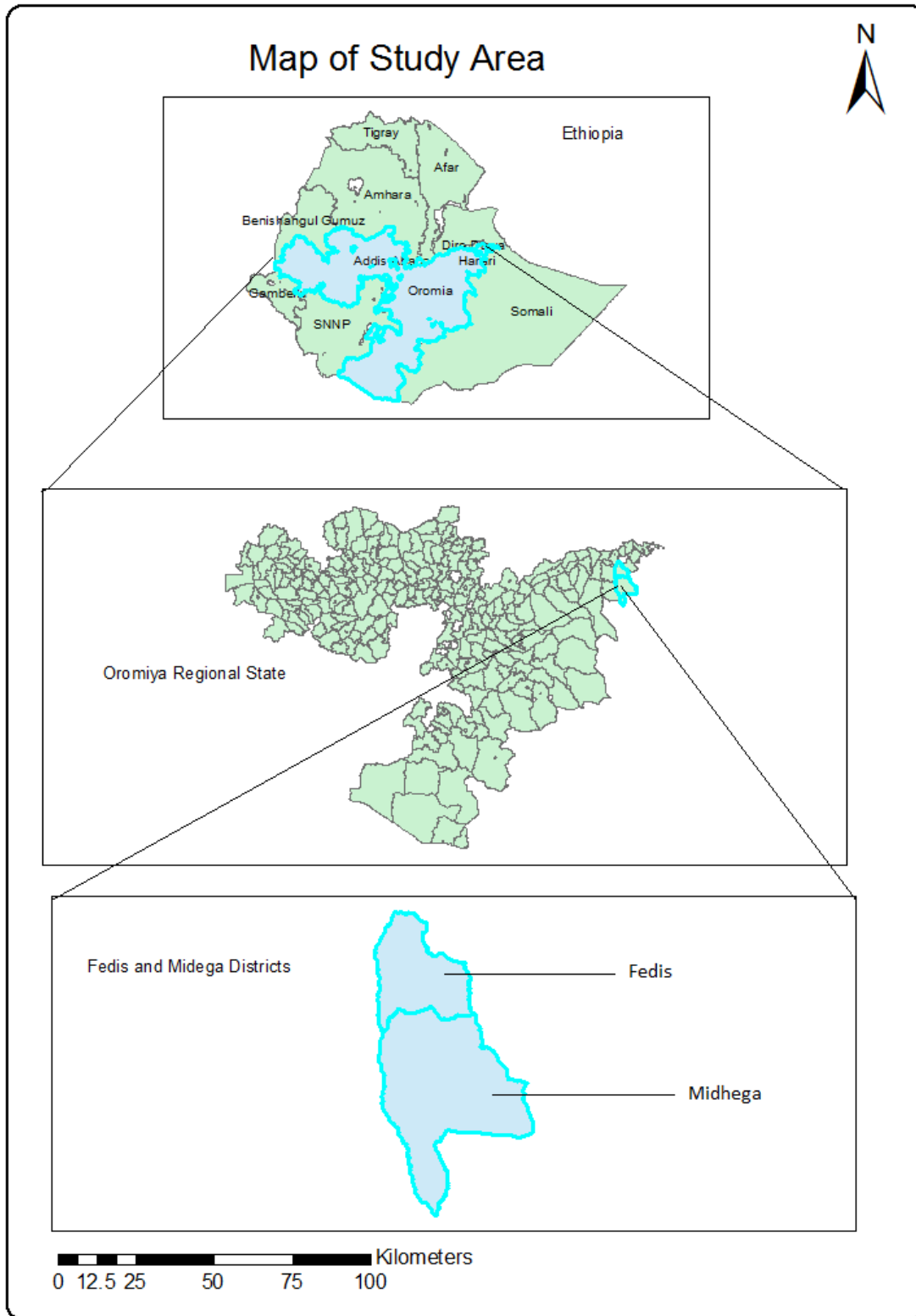


Figure 1:Map the study area

Methods of data collection

Medicinal plant species and the associated traditional knowledge of the study area were documented prior to this study (Abebe Worku, 2018). 12 key informants or traditional healers of the area were selected; 2 from each of the six kebles. All of the key informants were provided with the list of the medicinal plant species and asked to prioritize the medicinal plant species for the future sustainable utilization and conservation based on the medicinal value and vulnerability of the species. The ranks given to each of the medicinal plant species by all of the traditional healers were averaged by Microsoft excel for the 31 medicinal plant species to decide the average ranks of each of the medicinal plant species.

Species Identification

Most plant species were identified in the field by the help of the book called flora of Ethiopia and Eritrea. Few species which couldn't be identified at the field were identified at the herbarium of Addis Ababa University through collection of specimen.

Data Analysis

The collected data were summarized by Microsoft excel to find the

average rank for each of the medicinal plant species.

RESULTS AND DISCUSSIONS

The previous study on the medicinal plants and the associated indigenous knowledge in the study area revealed 53 medicinal plant species (Abebe Worku, 2018). However, for the current study only the first 31 medicinal plant species were considered based on their conservation status for prioritization exercise. Fabaceae is the first most frequent family represented with 5 species, the second family is Asteraceae with 4 species, and the third frequent families are both Oleaceae and Rhamnaceae containing 2 species each; the rest of the families such as Aloeceae, Menispermaceae, Cucurbitaceae, Solanaceae, Poaceae, Polygalaceae, Lythraceae, Lythraceae, Rhizophoraceae, Euphorbiaceae, Balanitaceae, Nyctaginaceae, Solanaceae, Poaceae, and Rosaceae are represented only by 1 species.

During the interview these listed medicinal plant species are all claimed to become rare and threatened in the natural forest by all of the key informants. Similarly, Tahir *et al.*, 2017 reported 44% of the forest plant species were highly threatened in Eastern Ethiopia. Source of these medicinal plant species is mainly from the wild and the people as well as the traditional healers don't have the practice of cultivating these species in home garden.

Table 1: Prioritized medicinal plant species and their rank

| Scientific name | Local name | Family | Rank of species |
|-------------------------------------|-----------------|----------------|------------------|
| <i>Trema orientalis</i> | Hudu Selim | Fabaceae | 1 st |
| <i>Solanecio angulatus</i> | Jinaras | Asteraceae | 2 nd |
| <i>Cissampelos mucronata</i> | Balteki | Menispermaceae | 3 rd |
| <i>Jasmin grandiflorum</i> | biluu | Oleaceae | 4 th |
| <i>Aloe calidophylla</i> | Argeesaa | Aloeceae | 5 th |
| <i>Cucumis dipsaceus</i> | Haregoge** | Curcubitaceae | 6 th |
| <i>Withania somnifera</i> | Hidebudie | Solanaceae | 7 th |
| <i>Cymbopogon citratus</i> | Citashekhussien | Poaceae | 8 th |
| <i>Polygala sphenoptera</i> | Harmel | Polygalaceae | 9 th |
| <i>Cardus macracanthus</i> | Qoree-harree* | Asteraceae | 10 th |
| <i>Tamarindus indica</i> | Roka | Fabaceae | 11 th |
| <i>Acacia brevispica</i> | Hamaresa | Fabaceae | 12 th |
| <i>Punica granatum</i> | Rumaan | Lythraceae | 13 th |
| <i>Impatiens rothi</i> | Buri | Balsaminaceae | 14 th |
| <i>Berchemia discolor</i> | Jejeba | Rhamnaceae | 15 th |
| <i>Kalanchoe quartiniana</i> | Bitu** | Crassulaceae | 16 th |
| <i>Vernonia amygdalina</i> | Eebicha | Asteraceae | 17 th |
| <i>Cassipourea malosana</i> | Lalessa | Rhizophoraceae | 18 th |
| <i>Croton macrostachys</i> | Bekkannissa | Euphorbiaceae | 19 th |
| <i>Balanites aegyptiaca</i> | Baddano | Balanitaceae | 20 th |
| <i>Ziziphus spina-christi</i> | Kurkua adi | Rhamnaceae | 21 st |
| <i>Doviyalis abyssinica</i> | Dhangaggoo | Flacourtiaceae | 22 nd |
| <i>Erythrina brucei</i> | Wolensu | Fabaceae | 23 rd |
| <i>Olea europea s.sp. cuspidata</i> | Ejersa | Oleaceae | 24 th |
| <i>Commicarpus africanus</i> | Kontoma* | Nyctaginaceae | 25 th |
| <i>Diospyros abyssinica</i> | Lookoo | Ebenaceae | 26 th |
| <i>Steganotaenia araliacea</i> | Afretoo | Apiaceae | 27 th |
| <i>Artemisia absinthium</i> | Ariitti/Sakeyu | Asteraceae | 28 th |
| <i>Rubus apetalus</i> | Gora | Rosaceae | 29 th |
| <i>Senna Italica</i> | Celeloo | Fabaceae | 30 th |
| <i>Cucumis ficifolius</i> | Hiddii | Cucurbitaceae | 31 st |

CONCLUSION AND RECOMMENDATIONS

Like in the various places elsewhere in the world, anthropogenic factors are playing a crucial role for the deteriorations of genetic resources of the country Ethiopia as well as the Fedis and Midega districts. In addition, the local community doesn't have the tradition of domesticating the wild genetic resources special the medicinal plant species. The traditional practitioners are using the only resource in the wild forest as a result the plant genetic resource in general and the medicinal plants genetic resource in particular is getting depleted alarmingly. There is an urgent need of conservation action for the medicinal plant species of the study area in specific and of the country in general. As the resource is limited we need to prioritize the species to be conserved in various respective localities. Conservationists who are concerned to work in the Fedis and Midega Districts could use the result of this study. Hence, we recommend the conservation actors of the study area to conduct their conservation and sustainable utilization activities by giving priority for the species listed in this study based on the resulted ranking outcome.

Abbreviations

CBD- Convention on Biological Diversity
 NBSAP- National Biodiversity Strategy Action Plan
 TM- Traditional Medicine
 MP- Medicinal Plant
 TK- Traditional Knowledge
 SPSS- Statistical Package for Social Sciences
 WHO- World Health Organization

Availability of Data and materials

The raw data set used for analysis is available at the author's hand.

Funding

This study was funded by the UNDP project called Enhanced Management and Enforcement of Ethiopia's Protected Area Estate.

Authors Detail

All authors were from Ethiopian Biodiversity Institute (EBI), Harar Biodiversity Center Po.Box:1121, Harar, Ethiopia

ACKNOWLEDGEMENTS

The authors' special word of thanks is to the study area community who were so kind and willing to supply us with

information on traditional medicinal plants and we would like to thank Fedis and Midega Agricultural offices and the experts of these offices for giving relevant information. We are also grateful for the project called Enhanced Management and Enforcement of Ethiopia's Protected Area Estate for providing fund.

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