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The significant contributions of women in ethnobotanical studies enhance the diversity of wild edible plant uses

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Abstract

Food and nutrition security represents one of humanity's most significant global challenges. Rural communities in developing countries depend on edible wild plants to fulfill their nutritional needs

during periods of food scarcity. The objectives of this study are: a) to review the existing information regarding the nutritional contributions of wild edible plants, and b) to assess the role of women in the utilization of wild edible plants as food in rural communities within the Shahrood region of Iran. Semi-structured interviews and participatory observations served as the data collection methods. The data were analyzed using usage report indicators. A total of 1,086 use reports were compiled from 44 interviews (20 men and 24 women), covering 67 wild edible plants and one fungus consumed by local communities. Knowledge of wild edible plants was greatest among women, comprising a total of 646 usage reports. Three species-*Allium iranicum* (Wendelbo) Wendelbo, *Mentha longifolia* L. Huds, and *Allium umbilicatum* Boiss-with reports numbered 75, 66, and 65 respectively, accounted for the highest usage reports. Our findings emphasize the significance of women's traditional knowledge in utilizing wild edible plant resources in this region.

Introduction

Wild edible plants (WEPs) are usually considered to constitute all plant resources that are neither cultivated nor domesticated (Biri et al. 2024). These plants grow in many different habitats (Wang et al. 2020; Khakurel et al. 2021) and play a vital role in ensuring food security for countless families around the world (Biri et al. 2024). Some rural communities in mountainous areas rely on these plants to meet their nutritional needs (Khakurel et al. 2021; Jalali et al., 2024) These plants and the food they produce are integral to the cultures of these societies, playing a crucial role in their lives (Jalali et al. 2024). WEPs assist the livelihoods of the local people in energy sources, construction, medicines, ecological services, aesthetics, income generation, and household utensils (Anbessa et al. 2024). They are also regarded as a means of survival for these local communities, particularly during times of drought, famine, and danger (Wang et al. 2020), Studying these plants is necessary not only to preserve ethnobotanical knowledge but also to conserve their populations genetic resources (Khakurel et al. 2021). Many ethnobotanical studies have shown differences in the

knowledge and practices held by men and women (Acosta-Naranjo et al. 2021). Decades of ethnobotanical observations have shown that knowledge varies significantly according to the identity attributes of participants, such as their religion, occupation, status, income level, geographic origin, and gender (Wall et al. 2018).

Iran is an ecologically diverse country with exceptionally rich botanical diversity (Noroozi et al. 2019). Many plant species in Iran are used for human consumption, most of which fall under the broad category of WEPs (Jalali et al. 2024). The food and nutritional contribution of WEPs has not been fully investigated in Semnan Province. Therefore, the objective of this review is to explore available information about WEPs nutritional contribution and examine the role of women in the use of WEPs in Semnan Province.

Methods

Study area and ethnobotanical data collection

The study area is located in northeastern Iran in the Semnan Province, Shahrood municipality, in the Bastam rangelands (36°33'41"–36°35'37" N and 54°40'39"–55°32'39" E). Ethnobotanical data were compiled through semi-structured interviews during field walks guided by informants and participatory observations. During these guided field walks, the informants were asked information about the collection and utilization of WEPs. A total of 44 informants were selected from 12 villages: 3 from Tash, 4 from Negarman, 11 from Abarsij, 2 from Ali Kahi, 1 from Hosseinabad, 3 from Meyghan, 3 from Qaleh Now-e Kharagan, 3 from Proo, 7 from Abr, 4 from Khij, 2 from Mazj, and 1 from Gilan. Among the informants were 11 males and 13 females (see Fig. 1).

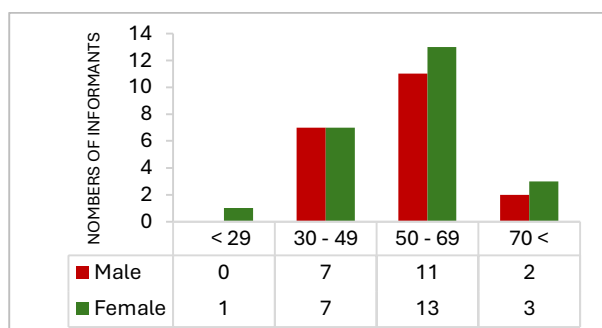


Fig 1. Age distributions of informants.

Data Analysis

The collected data were structured using reports in an Excel spreadsheet. The ethnobotanical importance indicator, including the use report, was calculated. Analyses were done using the ethnobotany R package in R.

Results

Diversity of WEPs in the study area

The 44 informants (20 men and 24 women) reported a total of 66 WEP species and one fungus from 54 genera and 24 families. Ethnobotanical information about these plants, including food categories and use reports, is listed in Fig. 3, while Fig. 4 (B) shows images of some WEPs found in the study area. A total of 1,086 use reports were documented from 44 interviews, of which 440 were related to men and 646 were related to women, as shown in Fig. 2 (A).



Fig 2. (A). Indicator of use report of plants (UR), (B). Collection of WEPs by rural women, and pictures of some WEPs in the study area: (C). *Stachys lavandulifolia*, (D). *Elwendia cylindrica* (Boiss. & Hausskn.) Pimenov & Kljuykov, (E). *Allium paradoxum*, (F). *Ferula foetida* (Bunge) Rege.

Dietary diversity

In this study, 1086 consumption reports based on the eating habits of people in the study area were classified into thirteen usage categories (Fig. 3). Among these categories, rice vegetable was the most cited consumption category with the most usage reports (37 species, 268 usage reports, 24.7%) (Fig. 4, Bb). By rice vegetable, we refer to WEPs that are prepared by boiling and mixed with rice dishes, followed by coco sabzi (28 species, 186 use reports, 17.1%) (Fig. 4, Ba). Coco sabzi is a traditional dish made from WEPs fried with eggs and spices. soup (39 species, 162 use reports, 15%), herb stew (32 species, 120 use reports, 11%), yogurt (16 species, 75 use reports, 7%), kashk (8 species, 71 usage reports, 6.5%) Kashk is a dish made from WEPs combined with dairy (kashk). salad (11 varieties, 47 reports of use, 4.3%), herbal tea (5 varieties, 43 reports of use, 4%), vegetable bread (10 varieties, 40 reports of use, 3.7%) (Fig. 4, Bc), pickled (9 varieties, 23 reports of use, 2.1%), ripe fresh fruit (9 types, 23 usage reports, 2.1%), snack (10 types, 22 usage reports, 2%) and finally jam (3 species, 6 reports of use, 0.5%).

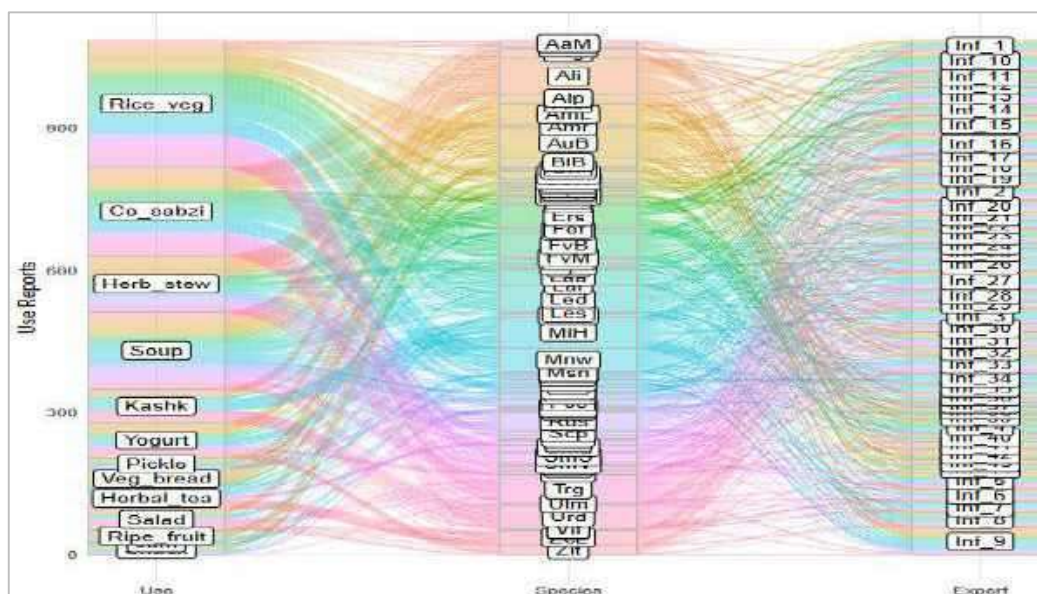


Fig 3. Usage report (UR) of 67 WEPs for 13 different food categories by 44 interviewees in 12 villages of Semnan, Iran.

Gender roles

We found differences in the total number of known WEP species and used reports between genders (Fig. 2, A, and 3). The respondents explained that women play a prominent role in using wild plants, as they are easily accessible around the village, and rangeland (Fig. 4, A). However, men showed greater knowledge of species in forested areas due to greater access to forested areas for their work.



Fig 4. A). Women collect wild edible plants for nutritional purposes, B). Food prepared from WEPs that are ready for consumption: (a). Coco sabzi, young leaves of *Allium grande Lipsky*, (b). Rice vegetable, leaves of *Eremurus* sp., and (c). Bread, different organs of *A. iranicum*.

Discussion

The importance of wild plants in feeding rural populations is widely recognized through various studies (Anbessa et al. 2024; Jalali et al. 2024). In our study region, the WEPs showed a wide range of variation, not only in the number of species but also in different categories of consumption for nutritional purposes. When compared to other studies (Luo et al., 2019). However, our research uniquely documented the use of these plants across 13 different nutritional categories, with a significant emphasis on the role of women in utilizing these plants, which has not been reported in studies conducted within Iran. The local people's WEPs collection calendar demonstrates valuable indigenous knowledge rooted in their rich culture of edible plant utilization. These species are facing growing threats such as over harvesting, drought and grazing, emphasizing the urgency of implementing stronger protection measures and adopting sustainable management practices.

Notably, our study sheds light on how collaborative activities in rural settings are especially important for women. Despite the gender imbalance in studies of neighboring countries (Hussain et al., 2023), due to religious and patriarchal family structures, which prioritize males as family heads and resource holders, our study of ethnographic knowledge has shown an important role of women in this field. They actively participate in the collection and utilization of WEPs and contribute to the seasonal household economy by using WEPs as a supplemental food source. Also, women are the primary decision-makers for food preparation in study area and can get to know more plants through gathering and cooking. Gender equality is seen as a goal and a means in achieving the Sustainable Development Goals (SDGs) (Duflo 2012). Overall, our study shows that these species play important role in household diets and have great potential to contribute to food and nutritional security. However, these results show the major contribution of women in linking knowledge between the food cultural domains. The women continue to play a key role in maintaining gastronomic cultural heritage in present days.

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