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A Review of Wild Edible Plants Used as Vegetables in Bingöl Province[A]

Nazan ERGUN[1], Sezai ERCİŞLİ[1], Muharrem ERGUN[2]*

Abstract: Wild edible plants (WEPs) continue to play a crucial role in rural food culture and biodiversity conservation in Türkiye, particularly in ecologically diverse regions such as in Bingöl Province. This review aimed to document and synthesize information on wild plant species traditionally collected and consumed as vegetables in Bingöl. A total of 21 species were identified through a review of regional ethnobotanical literature and validated with local knowledge, with emphasis on women's roles in transmission. Details are given for each species, with the scientific and local names, edible parts, preparation methods, harvesting times, and habitats. The review concludes that the majority of these plants are harvested during the spring and early summer months and are subsequently prepared through boiling, sautéing, or incorporation into traditional culinary preparations, including soups, pastries such as börek, and yoghurt-based dishes. Some of the most utilized species are *Urtica dioica, Malva neglecta*, *Rumex tuberosus,* and *Allium ampeloprasum*. The review highlights the significance of these plants in seasonal diets, traditional ecological knowledge, and local biodiversity. Furthermore, this review draws special attention to the urgent need to preserve traditional ecological knowledge in the context of environmental degradation and social and cultural change.

Keywords: Foraged plants, Bingöl, ethnobotany, vegetables, agrobidersity

[A] The study does not require approval from an ethics committee. The article has been prepared according to research and publication ethics.

***Corresponding Author:** [2] Muharrem ERGUN, Bingöl University, Faculty of Agriculture, Department of Horticulture, Bingöl, Türkiye, muharrem.ergun@yahoo.com, OrcID 0000-0002-0213-1245

[1] Nazan ERGUN, Atatürk University, Faculty of Agriculture, Department of Horticulture, Erzurum, Türkiye, nazan.ergun23@ogr.ata.edu.tr, OrcID 0000-0001-9338-2770

[1] Sezai ERCİŞLİ, Atatürk University, Faculty of Agriculture, Department of Horticulture, Erzurum, Türkiye, sercisli@atauni.edu.tr, OrcID 0000-0001-5006-5687

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Introduction

WEPs have long been integral to human diets, healthcare, and cultural practices, particularly in regions where access to cultivated crops is seasonal or limited. Across diverse ecological zones and societies, foraged plants serve not only as a vital nutritional resource, rich in vitamins, minerals, and fibre, but also contribute to household food security, especially during periods of scarcity or socio-economic stress (Bharucha and Pretty, 2010; Heywood, 2013).

Globally, over 7,000 plant species are consumed as food, yet the homogenization of agriculture has narrowed food diversity and led to the erosion of traditional ecological knowledge (TEK) associated with wild species (Prescott-Allen et al., 1990; FAO, 2010; Grivetti et al., 2000). This loss contributes to dietary monotony, the weakening of biocultural heritage, and a decline in agroecosystem resilience. Recognising this, researchers increasingly advocate for the conservation and reintegration of WEPs into modern sustainable food systems (Ndlovu et al., 2024).

The collection and consumption of WEPs remain deeply embedded in rural and indigenous cultures worldwide. In Southern Italy and Albania, for example, wild greens are used in both food and folk medicine, contributing to what researchers call “folk functional foods” (Pieroni and Quave, 2006). In Poland, archival data from the mid-20th century document extensive use of wild plants during times of scarcity, particularly during war and food insecurity (Łuczaj, 2008). Across South Asia, rural communities in Nepal rely heavily on traditional crops and foraged vegetables to maintain household food security and nutritional diversity (Gauchan et al., 2020). In sub-Saharan Africa, wild food plants remain an essential part of agroecological resilience strategies and are often undervalued in formal food systems (Ndlovu et al., 2024). Similar patterns are observed in Mexico and other parts of Latin America, where Indigenous food systems incorporate a vast array of non-cultivated plant species in everyday cuisine (Kuhnlein et al., 2009). These global patterns underscore the value of WEPs not only as dietary supplements but also as repositories of ecological knowledge and cultural heritage.

Türkiye stands out as a centre of plant biodiversity, with over 12,000 vascular plant species, approximately one-third of which are endemic (Ekim et al., 2000). The country's cultural and climatic diversity has fostered a rich tradition of foraging. Ethnobotanical studies conducted in various regions such as Çanakkale (Hançer et al., 2020), Sivas and Yozgat (Çelik, 2023), and coastal zones like İzmir (Tan et al., 2017) highlight the widespread and persistent use of wild plants as vegetables across Türkiye. Similar field-based documentation in Şanlıurfa (Alkış et al., 2021), Adıyaman (Kızılarslan et al., 2017), Van (Mükemre et al., 2015), Erzurum (Karakaya et al., 2019), and Solhan in Bingöl (Polat et al., 2013) confirms the continued reliance on wild greens and herbs in local diets. These studies, grounded in interviews with local communities and participant observation, reveal shared practices in the identification, preparation, and seasonal harvesting of edible wild species, underscoring the cultural significance of traditional ecological knowledge (TEK) in sustaining both biodiversity and local foodways.

In Eastern Anatolia, especially in Bingöl Province, the tradition of gathering wild greens remains active. These practices are embedded in everyday life and are commonly transmitted through oral culture, particularly among women and elders. However, this cultural legacy is increasingly at risk due to land-use changes, overharvesting, youth migration, and reduced intergenerational knowledge transfer (Mükemre et al., 2015).

Traditional ecological knowledge (TEK) encompasses the cumulative expertise passed down through generations, involving plant identification, seasonality, preparation methods, and ecological awareness (Pieroni and Quave, 2006; Turner et al., 2011). This knowledge not only ensures food safety and dietary diversity but also

strengthens cultural identity and community cohesion (Łuczaj, 2008; Çakır, 2017). Today, TEK systems are under increasing threat from globalisation and environmental degradation. Disconnections between people and their landscapes have resulted in a decline in local plant knowledge, particularly among younger generations (Çakılcıoğlu and Türkoğlu, 2010). As a result, documenting and revitalising TEK is urgent for maintaining food security, cultural heritage, and agrobiodiversity.

The principal aim of this study is to create and document a list of WEPs consumed as vegetables. This encompasses a comprehensive literature review and the validation of local individuals, with a particular emphasis on female voices. This review also aims to emphasize the importance of local ecological knowledge, food security, biodiversity, and the conservation of WEPs.

The Geographic and Phytogeographical Characteristics of Bingöl Province

Bingöl Province is located in the Eastern Anatolia Region of Türkiye and covers a total area of approximately 8,000 km². Its geographical coordinates are 38°30′–39°30′ N latitude and 40°00′–41°00′ E longitude. It is bordered by Tunceli to the northwest, Erzurum to the northeast, Muş to the southeast, Diyarbakır to the south, and Elazığ to the west. The provincial center is at an average elevation of 1,150 meters, in mountainous terrain that features Bingöl Mountain, which is more than 3,200 meters in height. Steep slopes, high plateaus, and narrow river valleys predominate in the topography, creating a mosaic of diverse microclimates and vegetation zones (Bingöl İl Kültür ve Turizm Müdürlüğü, 2025).

Phytogeographically, Bingöl is located at the intersection of three main floristic regions: The Irano-Turanian, Mediterranean, and Euro-Siberian regions. This transitional position creates high levels of botanical diversity and endemism. The Irano-Turanian element prevails, especially in steppe and subalpine belts, with taxa such as *Aegilops spp*. and certain *Allium spp.* being common. At medium altitudes, coniferous forests of *Pinus sylvestris* and *Abies nordmanniana* dominate, with lower altitudes possessing mixed deciduous forests of *Quercus brantii*, *Q. libani*, *Q. infectoria*, and *Populus spp.* (Ekim et al., 2000; Polat, 2019).

Higher elevations above the tree line are composed of subalpine and alpine vegetation. These include herbaceous plant species such as *Thymus spp*., *Rumex acetosella*, and *Achillea millefolium*, most of which are traditionally used as wild vegetables and medicinal herbs (Mükemre et al., 2015; Kılıç et al., 2017a). Montane meadows and sunny slopes also support genera like *Astragalus*, *Ferula*, *Gundelia*, and *Silene*, which are commonly found in traditional gathering activities. The highly vertical stratification, ranging from 800 to over 3,000 m, gives rise to a wide range of ecological niches, supporting a high amount of plant diversity and endemism (Avcı, 2005). The geological structure of the region is highly heterogeneous and consists of volcanic, sedimentary, and metamorphic substrates. This bedrock heterogeneity produces varied soil types and microhabitats contributing to floristic diversity. The region has a continental climate, with long, cold winters and short, warm summers. The annual precipitation varies by district, usually between 800 and 1,200 mm, with the majority falling as snow. This snow cover supports geophytes and spring ephemerals such as *Crocus spp.*, *Allium spp.*, and *Tulipa spp.*, which start growing early in the season following snowmelt (Öztürk et al., 2015).

According to national floristic data, more than 1,200 vascular plant species are reported in Bingöl Province many of which are endemic or rare for Eastern Anatolia. *Ferula meifolia*, *Centaurea karduchorum*, and *Verbascum bingolense* are a few of the notable endemics found in high-altitude grasslands, screes, and alpine habitats. These species face increasing pressures from overgrazing, unsustainable harvesting practices, and habitat changes due to climate change (Avcı, 2005).

The ethnobotanical landscape of Bingöl reflects this floristic richness. Indigenous species are commonly used in local food cultivation and folk medicine. Plants such as *Urtica dioica*, *Rumex tuberosus*, *Malva neglecta*, and *Polygonum cognatum* are often gathered from road banks, abandoned fields, and naturally regenerating meadows, highlighting their importance in rural life (Kızılarslan et al., 2017). Wild vegetable foraging is mainly limited to the brief spring and early summer periods, typically from April to June, coinciding with snowmelt and new growth. Early spring crops like *Allium schoenoprasum* and *Rumex acetosa* are among the first to appear, while others like *Thymus kotschyanus* and *Silene vulgaris* are more commonly found in early summer mountain meadows (Kızılarslan et al., 2017).

Overall, Bingöl Province is a significant center of botanical diversity in Türkiye. Its phytogeographically strategic position, wide altitudinal range, and ecological condition heterogeneity result in a rich assemblage of vegetation types, ranging from oak woodland and steppes to alpine meadows. With this biodiversity, it has a rich heritage of wild plant use that remains a key component of local food systems and cultural traditions.

Weps Used as Vegetables in Bingöl Providence

This review compiles studies conducted between 2000 and 2024 on wild plant species traditionally consumed as vegetables in Bingöl Province. The selection of species was based on previously published ethnobotanical surveys and regional literature, with an emphasis on locally validated uses.

A total of 21 species of wild edible plant, which are categorized as vegetables, have been documented in Bingöl province. In order to identify the relevant sources, consultation was undertaken with local people, with a particular emphasis on women (Table 1).

Table 1. List of WEPs used as vegetables in Bingöl province

Scientific Name	Local Name	Part Used	Preparation Method	Collection Period	Habitat	Reference
Allium ampeloprasum	Yabani pırasa	Leaves, bulb	Boiled, sautéed	April–May	Rocky slopes, fields	Behçet and Yapar (2020); Korkmaz (2024)
Allium schoenoprasum	Yabani soğan	Leaves	Fresh, omelettes	April–June	Meadows, slopes	Karakaya et al. (2019); Görhan and Öztürk (2021)
Anchusa azurea	Sığır dili	Leaves, stems	Boiled, sautéed	May–June	Roadsides, steppe	Polat et al. (2017); Polat (2019)
Capsella rubella	Çoban çantası	Young shoots	Cooked with bulgur	April	Disturbed fields	Karaca et al. (2015); Gümüşok et al. (2023)
Chenopodium album	Sirken	Leaves	Boiled, yogurt dishes	May–June	Fields, open areas	Polat et al. (2013); Polat (2019)
Crocus spp.	Çiğdem	Flowers, corms	Condiment, folk tea	March–April	Rocky soils, alpine zones	Yılmaz (2016); Alkış et al. (2021)
Eremurus spectabilis	Çiriş	Young shoots	Boiled, yogurt dishes	April–May	Dry hills, steppe	Polat et al. (2017); Behçet and Yapar (2020)
Ferula meifolia	Çaşır	Young shoots	Boiled, fried with eggs	April–May	Hills, steppe	Özek et al. (2023)
Gundelia tournefortii	Kenger	Young heads	Boiled, roasted	April–May	Rocky terrain, pastures	Polat et al. (2017); Özkan et al. (2025)
Malva neglecta	Ebegümeci	Leaves, stems	Soup, börek, stewed	April–June	Roadsides, gardens	Polat et al. (2013); Polat et al. (2017)

Scientific Name	Local Name	Part Used	Preparation Method	Collection Period	Habitat	Reference
Mentha pulegium	Yarpuz	Leaves, stems	Eaten raw, seasoning, tea	May–July	Moist meadows, streams	Altundag and Ozturk (2011); Pehlivan (2023)
Nasturtium officinale	Su teresi	Leaves, stems	Salads, pickled	April–May	Streams, channels	Polat et al. (2013); Zaman et al. (2024)
Polygonum cognatum	Madımak	Young shoots	Fried, boiled	April–May	Rocky fields, steppe	İnal et al. (2022); Demirpolat et al. (2023)
Portulaca oleracea	Semizotu	Leaves, stems	Salad, yogurt dishes	May–July	Gardens, fields	Kılıç et al. (2017b); Demirpolat et al. (2023)
Raphanus raphanistrum	Yabani turp	Leaves, young root	Boiled, sautéed	April–June	Fields, roadsides	Apuhan and Beyazkaya (2019); Esim and Çoruh (2021)
Rheum ribes	Işkın	Stems	Eaten raw or lightly cooked	May	High altitudes, rocky slopes	Oktay et al. (2007); Polat et al. (2013)
Rumex tuberosus	Yumrulu kuzukulağı	Leaves, tubers	Cooked, salad	April–May	Moist soils, grasslands	Polat et al. (2017); Demirpolat et al. (2023)
Satureja hortensis	Yaz kekiği	Aerial parts	Seasoning, tea	June–August	Dry fields, rocky slopes	Polat et al. (2013); Demirpolat et al. (2023)
Silene vulgaris	Kuşotu	Young shoots	Boiled, sautéed	April–May	Meadows, steppe	Polat et al. (2017); Demirpolat et al. (2023)
Thymus kotschyanus	Kekik	Aerial parts	Seasoning, herbal tea	May–July	Dry hills, mountains	Kılıç et al. (2017a); Cacan et al. (2018)
Urtica dioica	Isırgan	Young shoots	Boiled, with yogurt or bulgur	April–May	Streambanks, moist areas	Nadiroğlu and Behçet (2018); Demirpolat et al. (2019)

WEPs consumed as vegetables are given in the rest of the article under plant headings in alphabetical order.

Allium ampeloprasum

Allium ampeloprasum is one of the most widespread wild *Allium* species in Bingöl Province. Detailed ethnobotanical information, including its local name, edible parts, preparation methods, seasonal availability, and natural habitat, is summarised in Table 1. The plant holds an important place in the springtime diet, particularly valued for its nutritional richness and aromatic qualities (Behçet and Yapar, 2020; Korkmaz, 2024).

Allium schoenoprasum

Allium schoenoprasum is another widely used *Allium* species in the region. Key ethnobotanical characteristics can be found in Table 1. In rural kitchens, it is often used in a similar way to chives or green onions, contributing a pungent flavour to various spring dishes and reflecting a long-standing foraging tradition (Karakaya et al., 2019; Görhan and Öztürk, 2021).

Anchusa azurea

Anchusa azurea is valued locally for its distinctive flavour and culinary versatility. Table 1 provides the corresponding vernacular name, edible parts, culinary uses, and habitat. Its use is part of a broader Anatolian tradition involving *Boraginaceae* species, which are frequently harvested for food (Polat et al., 2017; Polat, 2019).

Capsella rubella

Capsella rubella is a commonly gathered wild green in the Bingöl countryside. Detailed usage information is included in Table 1. Although similar to *Capsella bursa-pastoris*, this species is appreciated for its seasonal availability and slightly bitter taste, especially during periods when other vegetables are scarce (Karaca et al., 2015; Gümüşok et al., 2023).

Chenopodium album

Chenopodium album, one of the most common wild vegetables in Bingöl, is widely incorporated into traditional meals. Refer to Table 1 for culinary and ecological attributes. This species is especially valued for its iron content and resilience across various soil types (Polat et al., 2013; Polat et al., 2019).

Crocus spp.

Wild *Crocus* species are occasionally collected for culinary and medicinal purposes. Their traditional uses and ecological characteristics are listed in Table 1. Though not consumed in large quantities, their cultural symbolism and role in herbal infusions remain notable (Yılmaz, 2016; Alkış et al., 2021).

Eremurus spectabilis

Eremurus spectabilis is one of the earliest spring greens harvested in Bingöl. Table 1 outlines the plant's edible portions, habitat, and uses. Its limited availability and distinctive taste render it a seasonal delicacy, commonly acknowledged across Eastern Anatolia (Polat et al., 2017; Behçet and Yapar, 2020).

Ferula meifolia

Ferula meifolia is among the most popular spring wild vegetables in the region. A summary of its culinary role and ecological profile is available in Table 1. Despite its strong aroma, the species is favoured for its medicinal benefits and early-season availability (Özek et al., 2023).

Gundelia tournefortii

Gundelia tournefortii is one of the best-known traditional wild vegetables in Eastern Anatolia. Its ethnobotanical characteristics are presented in Table 1. Notably, its seeds are used to produce "kenger" gum, highlighting its multifunctional value in both culinary and medicinal contexts (Polat et al., 2017; Özkan et al., 2025).

Malva neglecta

Malva neglecta is the most extensively used wild leafy green in Bingöl. Table 1 includes its common name, edible parts, and harvesting period. Due to its accessibility and nutritional qualities, it holds a well-established place in the local diet and folk medicine (Polat et al., 2013; Polat et al., 2017).

Mentha pulegium

Mentha pulegium is an aromatic species traditionally gathered for both culinary and medicinal purposes. Its harvesting season, habitat, and ethnobotanical role are outlined in Table 1. Its intense fragrance and antiseptic properties are deeply valued in rural Anatolian households (Altundag and Ozturk, 2011; Pehlivan, 2023).

Nasturtium officinale

Nasturtium officinale grows along freshwater sources and is consumed primarily during early spring. Relevant preparation methods and collection periods are provided in Table 1. With its high vitamin content and peppery taste, it is particularly favoured in raw or lightly cooked dishes (Polat et al., 2013; Zaman et al., 2024).

Polygonum cognatum

Polygonum cognatum is a spring herb found across much of eastern Anatolia and frequently consumed in places like Bingöl. Botanical and culinary attributes are listed in Table 1. The species is closely linked to regional identity and seasonal celebrations (Inal et al., 2022; Demirpolat et al., 2023).

Portulaca oleracea

Portulaca oleracea is one of the most frequently consumed wild greens in Türkiye. Its edible parts, seasonal growth period, and preparation styles are summarised in Table 1. Rich in nutrients, it is commonly used in salads and yogurt-based dishes (Kılıç et al., 2017b; Demirpolat et al., 2023).

Raphanus raphanistrum

Raphanus raphanistrum is a wild relative of cultivated radish. Ethnobotanical traits are provided in Table 1. Its slightly spicy leaves are appreciated for their flavour and are a common springtime ingredient (Apuhan and Beyazkaya, 2019; Esim and Çoruh, 2021).

Rheum ribes

Rheum ribes is a valuable spring plant in Bingöl and surrounding regions. Collection period, habitat, and traditional use are described in Table 1. It has a refreshing and sour taste, and is often considered a natural tonic. Due to its popularity, it is sometimes found in conventional markets and is associated with local identity (Oktay et al., 2007; Polat et al., 2013).

Rumex tuberosus

Rumex tuberosus is a lesser-known edible species among the *Rumex* genus. Its culinary and ecological information is documented in Table 1. Despite being harvested less frequently, it is appreciated for its sour notes and is integrated into soups and pastries (Polat et al., 2017; Demirpolat et al., 2023).

Satureja hortensis

Satureja hortensis is a fragrant herb that is occasionally picked in Bingöl. The local name, anatomical parts consumed, method of preparation, harvesting season, and geographical distribution are outlined in Table 1. Fresh or dried leaves and flowering shoots are used as a spice in stews, meat dishes, or herbal infusions.. It is of particular interest due to its antimicrobial properties and strong smell, making it an important component of Anatolian traditional medicine and cuisine (Polat et al., 2013; Demirpolat et al., 2023).

Silene vulgaris

Silene vulgaris is a a wild edible whose shoots are commonly used in spring dishes. Preparation methods and ecological context are listed in Table 1. Its soft texture and delicate taste make it a staple in rural households during the foraging season (Polat et al., 2017; Demirpolat et al., 2023).

Thymus kotschyanus

Thymus kotschyanus is a fragrant thyme species traditionally harvested for both culinary and medicinal purposes. Table 1 summarises its uses and seasonal profile. It is well known for its strong aroma and therapeutic applications in local folk practices (Kılıç et al., 2017a; Cacan et al., 2018).

Urtica dioica

Urtica dioica is a widely recognised wild edible in Türkiye, especially valued for its health benefits. Its harvesting period, culinary uses, and habitat are documented in Table 1. The plant is commonly used in soups and fillings and is recognised for treating conditions such as anaemia and joint pain (Nadiroğlu and Behçet, 2018; Demirpolat et al., 2019).

Conclusion

This review highlights some WEPs that are used as vegetables in Bingöl Province's food culture. Information on 21 wild species, such as widely eaten taxa *Urtica dioica* (ısırgan), *Malva neglecta* (ebegümeci), *Allium ampeloprasum* (yabani pırasa), and *Rumex tuberosus* (yumrulu kuzukulağı), demonstrates the density of local ecological knowledge and its role in household nutrition and cultural heritage. These plants are mostly picked in spring and early summer and processed using straightforward techniques such as boiling, sautéing, or being eaten raw. Their preferred environments range from stream banks and rocky slopes to disturbed fields and mountain meadows, reflecting the ecological richness of the region.

However, increased pressure from overharvesting, habitat degradation, and rural-urban migration threatens both populations of plants and the transmission of traditional information. Narrow ecological niche plants such as *Rheum ribes* and *Crocus spp.* are of specific concern since they may not be able to reach sustainability without intervention. Therefore, we propose the following:

- Conservation of key habitats such as alpine meadows and streambanks, which are rich in edible flora.
- Implementation of ethnobotanical training programs to involve younger generations in knowledge transmission and the creation of sustainable harvesting practices.
- Encouragement of agroecological incorporation, such as providing incentives for local domestic production of plants like *Mentha pulegium*, *Portulaca oleracea*, or *Capsella rubella* in garden beds to reduce pressure on the wild population.
- Incentivization through policy measures and local biodiversity inventories, including people-based monitoring of plant use patterns and regeneration trends.
- Conservation of Bingöl's WEPs' biocultural diversity is not only a way to enhance ecological sustainability but also food sovereignty, nutritional well-being, and local identity.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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