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STRUCTURAL CHARACTERISTICS AND MAJOR PRODUCTION PROBLEMS OF MINT (MENTHA SPP.) PRODUCTION IN KARKAMIŞ AND NIZIP DISTRICTS OF GAZIANTEP PROVINCE

GAZİANTEP İLİ KARKAMIŞ VE NİZİP İLÇELERİNDE NANE (MENTHA SPP.) ÜRETİMİNİN YAPISAL ÖZELLİKLERİ VE BAŞLICA ÜRETİM SORUNLARI

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Abstract

Mint (*Mentha spp.*) is one of the most important medicinal and aromatic plants grown in Turkey, because of its broad spectrum of applications in food, pharmaceutical and cosmetic industries. Although mint is economically important, little is known about the production characteristics and constraints faced by mint producers at the farm level. This study aimed to examine the socio-economic characteristics of mint producers and identify the major production and plant health constraints affecting mint cultivation in Karkamış and Nizip districts of Gaziantep Province, Türkiye. The primary data were collected via face-to-face interviews with 104 mint producers in 2020. The data were analyzed using descriptive statistical methods such as frequencies, percentages and arithmetic mean. The results indicated that most of the mint production is carried out by middle-aged producers with relatively small farms. Ease of marketing and relatively low production costs were the primary reasons for mint culture. The most predominant disease reported was rust of mint and the major biological constraints to production were aphid and weed infestations. The results also revealed that despite production and marketing problems, mint was considered an economically viable crop by the farmers. The productivity and sustainability of mint production in the region can be improved through: strengthening extension services, promotion of integrated pest management, improvement of producer organizations, and improvement of marketing opportunities.

Keywords: Mint, medicinal and aromatic plants, production constraints, Karkamış, Nizip, Türkiye

Özet

Nane (*Mentha spp.*), gıda, ilaç ve kozmetik sanayilerindeki geniş kullanım alanı nedeniyle Türkiye'de yetiştirilen en önemli tıbbi ve aromatik bitkilerden biridir. Nanenin ekonomik açıdan önemli olmasına rağmen, işletme düzeyinde üretim özellikleri ve üreticilerin karşılaştıkları sorunlar hakkında sınırlı bilgi bulunmaktadır. Bu çalışma, Gaziantep ili Karkamış ve Nizip ilçelerindeki nane üreticilerinin sosyo-ekonomik özelliklerini incelemeyi ve nane yetiştiriciliğini etkileyen başlıca üretim ile bitki sağlığı sorunlarını belirlemeyi amaçlamıştır. Araştırmanın birincil verileri, 2020 yılında 104 nane üreticisiyle yüz yüze gerçekleştirilen anketlerden elde edilmiştir. Veriler; frekans, yüzde ve aritmetik ortalama gibi tanımlayıcı istatistiksel yöntemler kullanılarak analiz edilmiştir. Araştırma sonuçları, nane üretiminin büyük ölçüde orta yaş grubundaki ve nispeten küçük işletmelere sahip üreticiler tarafından gerçekleştirildiğini göstermiştir. Pazarlama kolaylığı ve görece düşük üretim maliyetleri, üreticilerin nane yetiştiriciliğini tercih etmelerinin başlıca nedenleri olarak belirlenmiştir. Üreticiler tarafından en yaygın hastalık olarak nane pası, başlıca biyolojik üretim sorunları olarak ise yaprak biti ve yabancı ot istilası bildirilmiştir. Bulgular ayrıca, üretim ve pazarlama sorunlarına rağmen üreticilerin naneyi ekonomik açıdan kârlı bir ürün olarak değerlendirdiklerini ortaya koymuştur. Bölgede nane üretiminin verimliliği ve sürdürülebilirliği; yayım hizmetlerinin güçlendirilmesi, entegre zararlı yönetiminin yaygınlaştırılması, üretici örgütlerinin geliştirilmesi ve pazarlama olanaklarının iyileştirilmesiyle artırılabilir.

Anahtar Kelimeler: Nane, tıbbi ve aromatik bitkiler, üretim sorunları, Karkamış, Nizip, Türkiye.

1. INTRODUCTION

In the world, medicinal and aromatic plants (MAPs) have an increasing importance economically, as they are widely used in the food, pharmaceutical, cosmetic and health industries. The increased consumer demand for natural products along with the growth of herbal medicine and functional foods has stimulated the cultivation and commercialization of these crops in many countries (Laurent, 2025; Mudondo et al., 2025; Zamani et al., 2025; Awlqadr et al., 2026). Apart from their industrial value, MAPs are a major source of income for rural households and contribute to agricultural diversification and sustainable rural development (Ibraliu et al., 2025; Purohit et al., 2026; Thakur et al., 2026).

Mint (*Mentha spp.*) is one of the most widely cultivated MAPs because of its high economic value and wide range of applications (Mamadalieva et al., 2020; Song et al., 2026; Tsiaparas et al., 2026). It is used as fresh vegetable, dried herb, herbal tea, spice and flavoring agent and its essential oil is extensively used in pharmaceutical, cosmetic and food industries (Eftekhari et al., 2021; Saqib et al., 2022). Mint is a short duration crop and offers an opportunity to the producers to earn regular income under proper production and marketing conditions as compared to many other crops (Singh et al., 2019). Therefore, the cultivation of mint has been increased in various areas with suitable climatic and irrigation conditions (Salehi et al., 2018; Yousefian et al., 2023).

Turkey has suitable ecological conditions for the growing of many MAPs and is a leading producer for some species (Turkish Exporters Assembly, 2025; Ürüşan, 2026). Mint is cultivated in various parts of the country for domestic use and for export markets, adding to agricultural income and supplying raw materials for processing industries (Yenikalayci et al., 2025). However, mint production is often limited by plant diseases and pests, weed infestation, increasing input costs, labor shortages, irrigation needs, and marketing problems (Chaturvedi et al., 2022; Gupta et al., 2025). Such challenges can affect productivity, increase the cost of production, and affect the long-term sustainability and profitability of mint farming (Kumar et al., 2021).

Most of the previous studies on mint production were focused on agronomic performance (Parrey et al., 2023; Riveros Pineda et al., 2024; Sampaio et al., 2026), essential oil quality (Hubert-Schöler et al., 2025; Gruľová et al., 2026) and cultivation techniques (Verma et al., 2025a; Vinayak et al., 2025). However, relatively few studies have been performed on farm-level socio-economics. In previous studies focused on producers, the cultivation of mint is affected by factors such as production costs (Verma et al., 2025b), pest and disease pressure (Sturr et al., 2026), labor requirements (Upadhyay et al., 2025), and market accessibility (Chaturvedi et al., 2022), but the importance of these factors varies between regions. Furthermore, most of the available research has been on technical production aspects rather than on structural characteristics of mint farms and constraints faced by producers in production. Therefore, empirical evidence on the socio-economic profile of mint producers and farm-level challenges influencing mint cultivation is still limited, particularly in critical producing regions of Türkiye.

Together, the Karkamış and Nizip districts of Gaziantep Province are among the most important mint producers in Türkiye. According to the Turkish Statistical Institute (TSI, 2025), Karkamış and Nizip produced 9,738 and 8,520 tonnes of mint, respectively, representing 73.16% of Türkiye's total output of 24,800 tonnes. The share of the whole Gaziantep Province in national mint production was 78,88%. These figures show that the two districts are a significant and representative area for the study of mint production in Turkey. The mint-producing settlements examined in the study are located in the vicinity of the Euphrates River and have fertile alluvial soils, favorable climatic conditions, and irrigation opportunities that allow intensive agricultural production (Gaziantep Governorship, 2020; Gaziantep Metropolitan Municipality, 2020a). Mint has become an economically important crop for the producers in the area because of its low production costs, the possibility of several harvests during the growing season and favorable market demand (Gaziantep Provincial Directorate of Agriculture and Forestry, 2021). Mint farms are important at the local and national levels, but there is a lack of published farm level evidence on the structural characteristics of mint farms and the main production challenges faced by producers in Karkamış and Nizip.

The geographical indication registration of Nizip Mint (Mentha spicata L.) also indicates the regional importance of mint production. Nizip Mint, registered as a designation of origin in 2020, is characterized by its green color and aroma and is sold both fresh and dried. Its specific quality characteristics are linked to the climatic conditions of the area, the structure of the soil, the variations in temperature, the time of the harvest and the traditional drying methods. This registration shows the high geographical identity and value addition potential of mint production in the study area (Turkish Patent and Trademark Office, 2020; Gaziantep Metropolitan Municipality, 2020b).

Understanding the socio-economic characteristics, production practices and marketing situations of producers is imperative to enhance the competitiveness and sustainability of mint production. In addition, identifying the major production constraints can provide valuable information to extension services, researchers and policy makers in the design of interventions for improving farm productivity, reducing production losses and enhancing marketing opportunities. However, empirical studies on mint production at farm level are relatively scarce as compared to other agricultural commodities.

The study aims to investigate the socio-economic characteristics of the producers, determine the main reasons for mint cultivation and evaluate the main production and plant health constraints faced by the producers in selected mint producing settlements of Karkamış and Nizip districts in Gaziantep Province, Türkiye. The findings are expected to help in better understanding the mint production systems and to provide useful evidence for the development of policies and extension programs for improving the productivity, profitability and sustainability of mint cultivation in the region in the long run.

2. MATERIAL AND METHOD

2.1. Study Area and Data Collection

The study was conducted in mint-producing settlements located near the Euphrates River in Karkamış and Nizip districts of Gaziantep Province, southeastern Türkiye. These settlements benefit from fertile alluvial soils, favorable climatic conditions, and irrigation opportunities provided by the Euphrates River, creating suitable conditions for intensive mint cultivation. The location of the study area and the surveyed settlements is presented in Figure 1.

The study was based on primary data collected through face-to-face interviews with mint producers in March 2020. A structured questionnaire containing both closed-ended and open-ended questions was administered to producers located in the major mint-producing villages and neighborhoods of Karkamış and Nizip districts in Gaziantep Province. The questionnaire was designed to obtain information on producers' socio-economic characteristics, farm structure, land use, mint production practices, production constraints, diseases and pests and producers' opinions regarding the development and marketing of mint.

The study settlements were identified using records and information obtained from the Gaziantep Provincial Directorate of Agriculture and Forestry, the Karkamış Chamber of Agriculture, and the Hancağız Irrigation Association. Producers with at least 5 decares of total agricultural land were included in the survey population.

A total of 104 mint producers participated in the survey. The interviews were conducted in Elifoğlu, Kelekli, and Gürçay in Karkamış district and in Suboyu, İntepe, Yukarıbayındır, and Aşağıbayındır in Nizip district. These settlements are located near the Euphrates River and represent areas where mint production is concentrated because of favorable alluvial soils and access to irrigation.

The collected data were coded and analyzed using descriptive statistical methods. Frequencies, percentages and arithmetic means were used to summarize the socio-economic characteristics of producers, farm structure, production practices, production constraints, and marketing characteristics. The results are presented in tables to facilitate the interpretation of the findings and to provide a comprehensive overview of mint production in the study area.

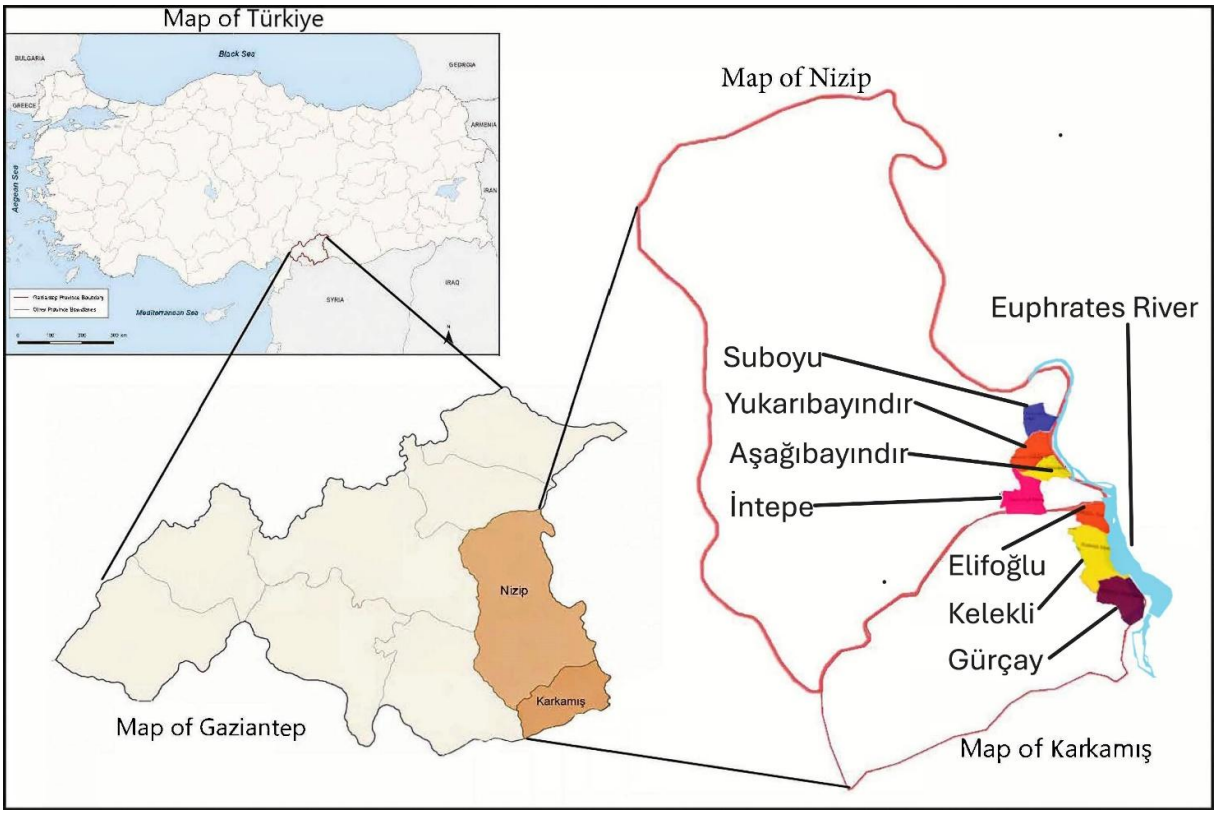


Figure 1. Location of the study area and surveyed settlements

3. RESULTS AND DISCUSSION

3.1. Socio-economic Characteristics of Mint Producers

Mint producers surveyed were predominantly middle aged with mean age of 41.8 years. The majority of the respondents were aged between 30 and 49 years old. The lowest age category was producers aged 29 years or younger. The distribution by age reveals that the active economic producers are the major actors in mint production in the study area.

The educational levels of the respondents were generally moderate. About two-third of the producers had primary and secondary education and only 8.7% had university education. The majority of households were comprised of four or fewer persons and the average household size was 3.8 persons.

The majority of producers were covered by social security. Moreover, 63.5% were members of an agricultural organization, which indicates that they were relatively strongly involved in producer organizations. But more than one-third of the respondents were not members of any agricultural organization, suggesting that there is still a lot of scope to improve producer organization and collective action.

Table 1. Socio-economic characteristics of the surveyed mint producers

Variable	Category	N	%
Age (mean 41.8 years)	≤29	17	16.3
	30–49	59	56.7
	≥50	28	26.9
Gender	Male	104	100.0
Marital status	Married	99	95.2
	Single	5	4.8
Education level	Primary school	33	31.8
	Secondary school	35	33.7
	High school	27	26.0
	University	9	8.7
Household size (mean 3.8 persons)	≤4 persons	74	71.2
	≥5 persons	30	28.8
Social security coverage	Yes	84	80.8
	No	20	19.2
Membership in an agricultural organization	Yes	66	63.5
	No	38	36.5

3.2. Income and Landholding Structure of Mint-Producing Farms

The farms surveyed were characterized by relatively modest household incomes. Almost half of the producers (45.2%) reported a household monthly income of 550 USD or less, and only 10.6% earned more than 850 USD per month. Households' main source of earnings was agriculture, with about three fourths of the producers reporting a monthly agricultural income between 301 and 600 USD.

The size of the farms was fairly evenly distributed among the landholding categories, but the majority were farms of 11–20 decares. On the other hand, the area of mint cultivation was relatively small. More than 70 per cent of the producers covered by the survey grew mint on five decares or less. Only one in ten used 16 decares or more for mint production. The findings indicate that mint is grown as an ancillary cash crop and does not occupy a large percentage of the total farm area.

The limited area devoted to mint cultivation also suggests that producers operate diversified farming systems that can reduce production risks and offer an additional income stream.

Table 2. Income and landholding characteristics of the surveyed farms

Variable	Category	N	%
Monthly household income (mean: 645.9 USD)	≤550	47	45.2
	551–850	46	44.2
	≥851	11	10.6
Monthly agricultural income (mean: 521.9 USD)	≤300	14	13.5
	301–600	75	72.1
	≥601	15	14.4
Total agricultural land (decare)	≤10	29	27.9
	11–20	38	36.5
	≥21	37	35.6
Mint cultivation area (decare)	≤5	73	70.2
	6-15	20	19.2
	≥16	11	10.6

3.3. Mint Yield by Cultivated Area

Average mint yield was not an increasing function of the area cultivated. The highest average yield was recorded by those producers who allocated moderate area to mint cultivation whereas those cultivating larger areas got comparatively lower yields. This pattern indicates that an increase in cultivated area does not necessarily translate into an increase in productivity.

The results suggest that crop management practices rather than scale of cultivation could have a greater effect on production efficiency. The way the irrigation is managed, the way the fertilization is done, the way the diseases and pests are controlled and the way the harvesting is done are probably more important for the yield than the size of the land used for mint production. Thus, the improvement of technical management practices provides more opportunities for increasing productivity than the expansion of cultivation areas.

Table 3. Average mint yield according to the area allocated to mint production

Mint production area (decare)	N	Mean yield (kg/decare)	Standard error
≤5	73	348.3	8.9
6-15	20	380.0	18.3
≥16	11	298.8	29.2
Overall	104	342.4	8.0

3.4. Reasons for Engaging in Mint Production

Results indicate that economic and marketing factors were the main drivers of producers' decision to grow mint. Ease of marketing and low production costs were the most often cited reasons, together accounting for nearly half of the responses. This indicates that mint is regarded by producers as a crop that is relatively easy to produce and market.

The least mentioned reason, however, was the availability of regular buyers. This finding suggests that although producers usually consider mint easy to market, the sales may not be through stable or long-term buyer relationships. The emphasis placed on extensive market potential, coupled with the scarcity of consistent buyers, further suggests a marketing framework dominated by short-term transactions rather than long-standing contractual agreements.

Crop hardiness and the possibility of recovering rapidly from production losses were also mentioned by some producers. These attributes may make mint an attractive, somewhat flexible crop for diversified farming systems. The results, on the whole, suggest that perceived cost and marketing benefits play a greater role than the existence of secure market linkages in the adoption of mint production (Table 4).

Table 4. Main reasons reported by producers for cultivating mint

Reason for cultivating mint	N	%
Ease of marketing	25	24.0
Low production costs	24	23.1
Rapid and low-cost recovery from production losses	13	12.5
Crop hardiness	12	11.5
Broad market potential	12	11.5
Low marketing costs	12	11.5
Availability of regular buyers	6	5.8

Major Plant Health Problems in Mint Production

Plant health problems are one of the major production constraints of the mint producers in the study area. The most commonly reported disease was mint rust, indicating that fungal diseases represent an important challenge to maintain yield and product quality. Aphids and weed problems also were mentioned frequently, demonstrating that both insect pests and weed competition continue to be problems for mint production.

Verticillium wilt and mites were reported less often, but the fact that they were reported at all suggests that producers are dealing with a wide variety of biotic stresses that require integrated management strategies. These results show the need to reinforce extension services and improve producers' access to efficient disease, pest and weed control methods. Adoption of integrated pest management (IPM),

regular field monitoring and timely control measures may be helpful in improving the productivity and reducing the production losses of mint cultivation.

Table 5. Major diseases, pests, and weed problems reported by mint producers

Disease, pest, or weed problem	N	%
Mint rust	35	33.6
Aphids	20	19.2
Weeds	18	17.3
Verticillium wilt	10	9.6
Mites	9	8.7
Other	12	11.5

4. CONCLUSIONS AND RECOMMENDATIONS

Mint production is an important agricultural activity in the surveyed settlements of Karkamış and Nizip districts and an additional source of income for many farm households. The results show that the cultivation of mint is generally done by middle-aged producers with relatively small-scale farms. The majority of producers are members of agricultural organizations. Mint is cultivated in restricted areas and is mainly a secondary crop in mixed farming systems, rather than the primary agricultural activity.

Economic factors play a key role in influencing producer decisions regarding mint cultivation. The main reasons for production were found to be ease of marketing and relatively low production cost. Nevertheless, the low importance assigned to the availability of regular buyers implies that marketing relations are mostly based on short-term exchanges rather than stable commercial partnerships. This can weaken the bargaining power of producers and increase their vulnerability to market fluctuations.

The results show that problems of plant health continue to be an important challenge for the production of mint. The most common disease was found to be mint rust followed by aphids and weed infestation. These results suggest, better disease, pest and weed management should be a priority to improve production efficiency and keep product quality.

Taking these results into account, more emphasis should be given to the reinforcement of agricultural extension services, especially in integrated disease and pest management, efficient fertilization, irrigation practices and sustainable crop management. Expanding producer training programs could enhance technical knowledge and raise productivity.

From a marketing perspective, producer cooperation and collective marketing initiatives could contribute to more stable market access by strengthening producers' bargaining power. Investment in post-harvest handling, drying, storage, processing and value added production can also help reduce product losses and improve profitability. In addition, the current geographical indication registration of Nizip Mint can be better utilized in order to increase the visibility of the product, support quality differentiation and create new marketing opportunities in domestic and international markets. Producer participation, certification, promotion and coordinated marketing may also be used to extend the benefits of this regional identity to increase the value added generated from mint production in the study area.

Overall, improving production efficiency and addressing plant health constrains will be critical to improve the long-term competitiveness and sustainability of mint production in the surveyed production area. Further studies, based on farm-level economic analyses and econometric modelling, could provide more insights on the drivers of productivity and profitability and the adoption of improved production practices by producers.

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