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SPECIES COMPOSITION OF PATHOGENS CAUSING DISEASES OF BAY LAUREL UNDER THE CONDITIONS OF THE LANKARAN REGION

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Summary

This article examines the results of studies conducted on diseases that have been damaging the noble laurel (Laurus nobilis L.) plant for many years. Since the mycobiota of the noble laurel plant has not been studied, the lack of scientifically substantiated measures against them led us to determine the species composition of pathogens. The main goal of the study is to study the mycobiota of the noble laurel plant, identify the most widespread and main harmful species, and develop a system of measures against them.

The studies were conducted in private gardens in the Lankaran-Astara region in 2021-2024. Route surveys related to the study of the species composition of diseases of the noble laurel plant in the Lankaran-Astara region were conducted by K.M. Stepanov, A.E. Chumakov (1972), A.E. Chumakov, I.I. Minkevich, Y.I. Vlasov and E.A. Gavrilova (1974) were carried out 3 times during the research years according to the methods. When determining the fungi that are pathogens, various identification methods were used (N.A. Naumov, 1937; S.V. Vasilyevoy, 1974; A.E. Chumakov, Y.I. Vlasov, 1979; P.N. Golovin et al., 2002).

As a result of a comprehensive study of the mycobiota of diseases of the noble laurel plant, for the first time, a large amount of factual material was collected on the species composition of diseases and the spread of individual diseases. As a result of the conducted studies, 10 pathogens of laurel plants were identified: southern root rot, brown leaf spot (anthracnose), macrophomosis, powdery mildew, wilt, etc.

These pathogens are grouped into 12 genera. 10 species included in the general mycobiota are new to the mycobiota of the noble laurel plant growing in the region.

Keywords: bay laurel, laurel leaves, harmfulness, phytopathogenic microorganisms, diseases, degree of damage, biological characteristics, wilting

Introduction

Bay laurel (*Laurus nobilis* L.) is one of the oldest cultivated plants and belongs to the Lauraceae family, which consists of 45 genera comprising more than 1,000 species distributed in tropical and subtropical countries [1]. Bay laurel – *Laurus nobilis* L. – is an evergreen woody, dioecious, and rarely monoecious plant reaching a height of 12–15 m. It is one of the most ancient and widely distributed plants, with roots extending deep into antiquity. Such interest in the study of bay laurel can be explained by the fact that this plant has long been and remains one of the most widely used well-known aromatic food seasonings by populations in different countries of the world.

The leaves of bay laurel are of medium size (mesophyllous), with an area of 17.53 ± 0.45 cm²; they are simple, entire-margined, leathery, glossy dark green on the upper surface and light green on the lower surface. They possess a rigid leathery structure, are broadly lanceolate, 4–10 cm long and 2–5 cm wide, and are borne on short grooved, glabrous petioles. The leaf apex is pointed, while the base is narrowly cuneate. The leaf margin is broadly undulate and cartilaginous. Venation

is pinnate-reticulate. On the lower surface of the leaf, depressions sometimes occur in the axils of the secondary veins, covered with hairs. The lifespan of the leaves is 3–4 years.

Flowering occurs in April–May from the age of 4–6 years. The flowers are unisexual or bisexual; the male flowers possess large yellow stamens, whereas the female flowers are inconspicuous. The yellow-green flowers are arranged in clusters and, as they mature, gradually transform into green berries, which later darken to black. The fruits are one-seeded drupes (seeds without endosperm), elliptical or ovoid, 9–22 mm long and 9–12 mm in diameter, blue-black in color, with a thin, easily crushed stone оболочка, and ripen in September–October. The weight of one seed is 0.8–1.2 g [6].

The leaves and fruits of this plant contain essential and fatty oils that are widely used for technical, medicinal, and food purposes. One of the distinctive features of this plant is that essential oil is present in all its parts; it is precisely for this reason that bay laurel is distinguished by its high vitality [2].

Bay laurel leaves are widely used in the traditional dishes of peoples not only of the Mediterranean countries but also of many other countries where the plant has long been and continues to be successfully cultivated.

In addition, an analysis of the available scientific information has shown that the phenolic compounds of bay laurel constitute one of the main groups of active compounds of this plant. The use of these data is important for the development of new effective medicinal products based on bay laurel raw materials [1].

In the traditional medicine of various peoples, bay laurel leaves are used in the treatment of diabetes and diseases caused by fungal and bacterial infections. Extracts from bay laurel leaves possess anti-inflammatory, sedative, and antiepileptic properties [3, 4]. The infusion is used for various gastrointestinal disorders, as well as for flatulence as a carminative agent.

The root system of bay laurel stabilizes the soil; therefore, it is used on slopes as a measure against soil erosion. In addition to its industrial importance, bay laurel also has great ornamental value. It is widely used in the landscaping of parks and household plots and is planted as borders, solitary specimens, and hedges. Bay laurel tolerates formative pruning well, which makes it possible to give the plant artificial decorative shapes.

The natural habitats of this evergreen plant are the territories of Mediterranean countries with high annual precipitation levels. It is grown as an ornamental species in Europe, Russia, the United States, and other countries, and is cultivated in Türkiye, Algeria, Morocco, Portugal, Spain, Italy, France, Russia, and Mexico. In the territory of Russia, bay laurel grows in the southwestern districts of Krasnodar Krai and in Crimea.

In Georgia, the issues of bay laurel cultivation were studied by P. A. Kvartskhava, D. N. Kalandadze, E. M. Zuzunova, L. A. Kanchaveli, I. S. Djashi, V. K. Danelia, V. G. Mkervali, L. A. Kechakmadze, and A. A. Nikopaishvili.

For industrial purposes, bay laurel is cultivated in the Lankaran-Astara region. The leaves are used, being collected mainly during the winter period.

Recently, the weakening of attention to bay laurel cultivation has contributed to the mass spread of pests and diseases, which has led to a decrease in yield and a reduction in the commercial value of bay leaves. With the expansion of the cultivated areas under bay laurel, we are currently conducting scientific research aimed at identifying the species composition of the pathogens causing diseases of this crop.

The aim of our study was to identify the species composition of the pathogens causing the major diseases of bay laurel in the Lankaran-Astara region.

Materials and methods

During the research work carried out throughout 2021–2024, mycofloristic investigations were conducted to study the species composition of micromycetes developing on bay laurel growing in the territory and household farms of the Lankaran-Astara region. Sampling was carried out

by the route method, and identification was performed in accordance with generally accepted methods (Bilai, 1982). The fungal species, as well as their synonyms, were verified against the international mycological global database Index Fungorum http://www.indexfungorum.org.

The study was carried out using information retrieval databases (PubMed, Google Scholar) and library databases (eLibrary, CyberLeninka), as well as the ResearchGate application for semantic search. Laboratory studies and the identification of the pathogens causing diseases of bay laurel were conducted in the Department of Plant Protection of the Azerbaijan Research Institute of Plant Protection and Technical Crops. In studying the bioecology of fungi, the existing methods used in phytopathological research were applied.

The prevalence of the disease (P) was determined based on the number of diseased plants for each sample as a percentage of the total number according to the formula:

$$P = п \times 100 / N,$$

where N is the total number of plants, and n is the number of diseased plants.

The intensity of disease development is a qualitative indicator that characterizes the degree of plant damage. To determine it, rating scales were used indicating (in %) the affected part of the plants. The calculation of the intensity of damage to bay laurel leaves was carried out according to the following scale: 0 – no damage; 1 – isolated spots, up to 5% of the plant surface affected; 2 – up to 25% of the surface affected; 3 – up to 50% affected, with the fruiting bodies of the pathogen clearly visible; 4 – more than 50% of the plant surface affected (Gutner et al., 1937).

Disease development was determined according to the formula:

$$C = \sum (n \times в) 100 / N\ d,$$

where Σ(n × b) is the sum of the products, that is, the number of plants (n) affected to the same degree within one score category (b) multiplied by the corresponding disease severity score; d is the highest score on the assessment scale.

The weighted average disease score (Bx) was calculated according to the formula:

$$Bx = \sum(n \times в)/ N,$$

where Σ(n × b) is the sum of the products of the number of diseased plants (n) and the corresponding disease severity score (b).

Results and discussion

As a result of the scientific research carried out by us in parks and household plots of the Lankaran-Astara region, a whole range of microorganisms causing diseases in bay laurel were identified, which leads to a reduction in the aesthetic value and deterioration of the plant's health. Timely detection, symptoms and degree of infection, as well as the biological characteristics of the fungus, are of vital importance for controlling them. Among the most harmful fungi, the following were distinguished: *Verticillium albo-atrum* Reinke et Berth., *Colletotrichum lauri*, *Macrophoma georgia* Ketch, *Sclerotium rolfsii* Sacc., *Septoria* sp., and others.

According to the study by Beradze L. and co-authors, the mycobiota of bay laurel includes more than 24 fungal species, among which representatives of the genera *Alternaria*, *Fusarium*, *Cladosporium*, *Phyllosticta*, and *Colletotrichum* dominate [7]. The authors emphasize that most of the identified species are potentially pathogenic and capable of causing necrotic lesions on the leaves. Phytosanitary monitoring of the territory of garden-park facilities and household farms of the Lankaran-Astara region showed that each year the bay laurel plantations were affected by pathogens such as *Verticillium albo-atrum* Reinke et Berth., *Colletotrichum lauri*, *Macrophoma georgia* Ketch, *Sclerotium rolfsii* Sacc., *Septoria* sp., and others.

According to our observations under the conditions of the Lankaran-Astara region, the most widespread disease of bay laurel during the years of research was *Colletotrichum lauri*, with a prevalence of 32.7%. The disease caused by the pathogen *Macrophoma georgia* Ketch had a prevalence of 25.3%, *Phytophthora cinnamomi* Rands – 17.2%, *Verticillium albo-atrum* Reinke & Berthold – 18.2%, *Sclerotium rolfsii* Sacc. – 19.2%, and *Ascochyta laurina* – 16.2% (Fig. 1).

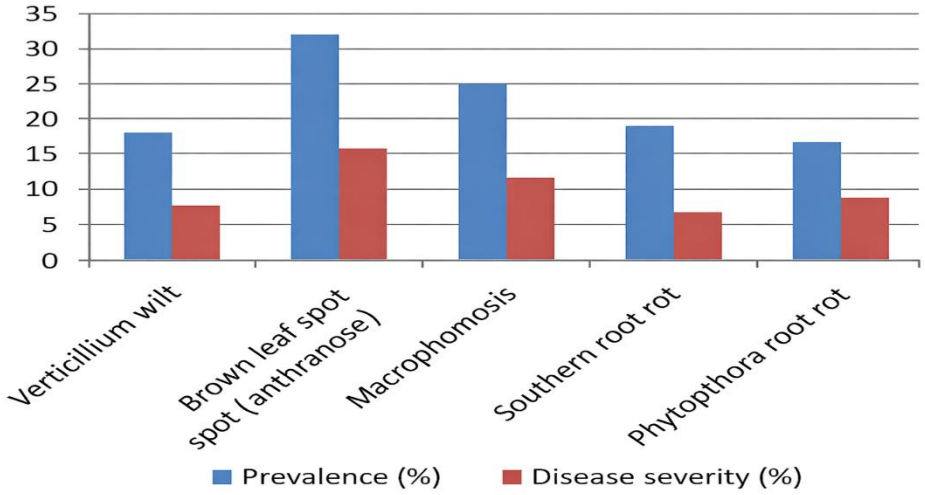

Fig. 1. Distribution of the main disease-causing pathogens on bay laurel (*Laurus nobilis* L.)

Verticillium albo-atrum Reinke et Berth., a fungus belonging to the phylum Ascomycota, class *Sordariomycetes*, order *Glomerellales*, family *Plectosphaerellaceae*, genus *Verticillium*, is the causal agent of verticillium wilt, which is one of the major diseases of bay laurel.

It causes damage to the root system and is manifested by wilting of the aboveground parts of the plant. The pathogen penetrates the roots and spreads through the vascular system, blocking the flow of water and nutrients. As a result, the plants gradually dry out.

The disease is highly dangerous and difficult to control. The strain *Verticillium albo-atrum* can persist in the soil for many years in the form of microsclerotia.

The fungus has a septate mycelium; the microconidia are spindle-shaped, and the spores are elliptical, hyaline, measuring 6–12 × 2.5–3 μm**.**

Fig. 2. Fungus *Verticillium albo-atrum*

The disease begins with the weakening of the development of the apical leaves; they start to turn yellow, lose their turgor, wilt, and fall off, which causes the drying of the branches. Sometimes the disease progresses so rapidly that the plant wilts without any change in leaf color and dries out completely (Fig. 1).

This disease can be identified by the brown discoloration in the central part of the leaf, which often extends to the tip. It has been established that the infection mainly penetrates from the soil.

The toxic substance released by the fungus spreads from the bottom upward and causes intoxication of the entire plant, disrupting metabolic processes and leading to plant desiccation.

The damage caused by this disease reaches 20–25%.

Fig. 3. Verticillium wilt of leaves.
The damage caused by the pathogen of verticillium wilt reaches 25–30%.

While studying the fungal diseases of bay laurel under the conditions of the Lankaran-Astara region, we were able to establish that brown leaf spot on bay laurel is caused by a fungus of the genus *Colletotrichum*.

According to data from the literature, the Italian mycologist Pier Andrea Saccardo considered that brown leaf spot on bay laurel is caused by the fungus *Gloeosporium nobile* Sacc.

According to Saccardo, the fungus spreads on both sides of the leaf in the form of round clay-yellow spots with dark margins along the edges, measuring 4–5 μm in diameter. The fruiting bodies are arranged in clusters and immersed in the leaf tissue.

The spores of the pathogen are spindle-shaped, slightly curved, measuring 20–25 × 6–7 μm, tapering downward, with many transparent droplets. The conidiophores are rod-shaped, simple, 45–50 × 2–2.5 μm, and sometimes septate.

Colletotrichum lauri is a fungus belonging to the phylum Ascomycota, class *Sordariomycetes*, order *Glomerellales*, family *Glomerellaceae*, genus *Colletotrichum*, and is the causal agent of brown leaf spot of bay laurel, or anthracnose. It affects leaves, shoots, seedlings, and seeds.

The first obvious sign of anthracnose is the appearance of brown or whitish spots on the surface of the leaf blades. Initially, the disease manifests itself as a brown spot with a dark border, which subsequently acquires a gray color. Sometimes the spots merge with one another, occupying a significant part of the leaf and shoots and penetrating deeper into the internal tissues, forming ulcers that acquire a brown coloration (Fig. 2).

A similar pattern is observed when shoots and seedlings are affected; in the case of fruit infection, fruit rot is first observed externally, followed by seed infection.

Our study established that the spores of the fungus causing brown leaf spot on bay laurel are cylindrical with rounded ends, olive-colored with oil droplets, measuring 14.5–23.2 × 3.5–6.5 μm. Brown setae with 2–3 septa are formed on the acervuli, measuring 52–82 × 5–10 μm.

When comparing the morphological characteristics of the fungus causing brown leaf spot on bay laurel with *Gloeosporium nobile* Sacc., as described by Pier Andrea Saccardo, it is evident that the latter fungus does not form setae on the acervuli, whereas their presence was observed in our samples.

According to Saccardo, the fungal spores are spindle-shaped, slightly curved, and taper downward, whereas the spores described by us are cylindrical.

Fig. 4. Brown leaf spot or anthracnose

To study the harmfulness of brown leaf spot, the dynamics of disease development were investigated. For this purpose, 20 plants were selected diagonally within the designated observation plot, from which 500 leaves were collected.

First, all diseased leaves were collected from each bush, and then healthy leaves were added until the total reached 500 leaves. After that, all collected leaves — 10,000 in total — were mixed and divided into 10 samples, each containing 1,000 leaves.

The analysis of these samples was carried out using a 5-point scale. The obtained data show that the damage caused by anthracnose reaches 21.3%.

Phytophthora cinnamomi Rands is a pathogenic fungus-like organism belonging to the phylum Oomycota, class *Peronosporomycetes*, order *Peronosporales*, family *Peronosporaceae*, genus *Phytophthora*, and causes disease of the root system of bay laurel. It is manifested by wilting, yellowing, and leaf fall. Induced damage to the root tissues develops. The sporangia are colorless, oval, and slightly elongated, usually multispored, with dimensions of approximately 68–90 × 24–35 μm [8].

Macrophoma georgia Ketch., a fungus belonging to the phylum Ascomycota, class *Dothideomycetes*, order *Botryosphaeriales*, family *Botryosphaeriaceae*, genus *Macrophoma*, is the causal agent of macrophomosis of bay laurel, which is considered a significant disease.

This disease is caused by the fungus *Macrophoma georgia* Ketch. In Georgia, it was first reported in 1961 by L. A. Kechekmadze. It affects leaves, shoots, branches, and seedlings.

Under our conditions, observations and laboratory studies established that the fungus affects leaves and shoots, causing various types of damage.

Fig. 5. Macrophomosis of bay laurel

On the leaves, the spots are initially dark brown and later become light brown, varying in size, and are separated from the healthy tissue by a reddish-brown border. Fruiting bodies appear in the form of black spots on both sides of the leaf (Fig. 3).

The fungus also causes disease of the leaf petiole, which becomes constricted and falls off

together with the leaf. Young shoots initially wilt and then dry out, while on branches the fungus causes the drying of the upper parts.

The conducted studies established that the infection of bay laurel leaves by macrophomosis reaches 20–25%.

Pseudoidium lauracearum Braun, belonging to the order *Erysiphales*, is a specialized fungus and the causal agent of powdery mildew of bay laurel.

The infection can be detected by the appearance of a white coating on the surface of the leaves resembling flour. Grayish-white powdery spots appear on the leaves, most often located on the petioles and young shoots. The leaf blade retains its green color; however, chlorotic areas are observed on its upper surface.

The fungus *Oidium lauracearum* Graniti Braun is characterized by a superficial, well-developed septate mycelium, and the conidia are formed singly — this feature is used for species diagnosis.

The conidia are ellipsoidal, hyaline, measuring 28–40 × 14–22 μm. The conidiophores are erect, two- or three-celled [8].

Ascochyta laurina E. Tasii is a pathogenic fungus belonging to the phylum Ascomycota, class *Dothideomycetes*, order *Pleosporales*, family *Didymellaceae*, genus *Ascochyta*, affecting bay laurel and causing leaf and shoot spot disease.

Microscopic examination showed that the fungus forms septate hyphae and unicellular, elongated structures measuring 140–166 μm.

The conidia are cylindrical, hyaline, measuring 6.4–8.3 × 2.5–4.5 μm (Fig. 4).

Fig. 6. Ascochyta leaf spot of bay laurel

Diplodia laurina Sacc. et Pass. is a fungus belonging to the phylum Ascomycota, class *Dothideomycetes*, order *Botryosphaeriales*, family *Botryosphaeriaceae*, genus *Diplodia*, and causes a fungal disease of the bay laurel tree.

The conidia are cylindrical in shape, light brown with a smooth surface, measuring 14.4–19.1 × 9.2–10.3 μm.

Fig. 7. Southern sclerotial root rot

This is a polyphagous pathogen, widely distributed in various regions and posing a serious threat to bay laurel seedlings. The symptoms of the disease are manifested in the form of dark, elongated spots around the root collar, which rapidly spread along the stem (Fig. 5).

When the spot completely encircles the stem, the plant begins to dry out.

The disease causes significant damage, especially in nurseries, where losses may reach 30–40%. Elevated temperature and humidity strongly promote the intensive development of the fungus [9].

Phoma laurela Sacc. is a fungus belonging to the phylum Ascomycota, class *Dothideomycetes*, order *Pleosporales*, family *Phaeosphaeriaceae*, genus *Phoma*. It is a leaf parasite causing leaf spot disease and affects bay laurel leaves.

The fruiting bodies are black and small, measuring 80–165 μm in diameter. The conidia are oval, hyaline, and smooth, measuring 8–12 × 2.5–5.0 μm.

In addition to the above-mentioned diseases, bay laurel is also affected by scab, cercosporosis, alternariosis, and septoriosis, but only to a minor extent (Table 1).

Table 1. Phytopathogens of Bay Laurel (*Laurus nobilis* L.)

No.	Pathogen	Morphology	Affected organs	Notes
1	*Verticillium albo-atrum* Reinke et Berth.	Septate mycelium, spindle-shaped microconidia	Roots, vascular system	Causes verticillium wilt
2	*Colletotrichum lauri*	Septate mycelium, cylindrical conidia	Leaves, shoots, fruits	Anthracnose lesions
3	*Macrophoma georgica* Ket.	Septate mycelium, dark-brown pycnidia, unicellular oval conidia	Leaves, shoots	Macrophomosis
4	*Sclerotium rolfsii* Sacc.	White mycelium, spherical sclerotia 0.5–2 mm	Roots, stems	Southern root rot
5	*Oidium lauracearum* Graniti	White powdery coating, solitary ellipsoidal conidia	Leaves	Powdery mildew

No.	Pathogen	Morphology	Affected organs	Notes
	Braun			
6	*Phoma laurela* Sacc.	Septate mycelium, pycnidia	Leaves, shoots	Necrotic spots
7	*Phyllosticta laurella* Sacc.	Pycnidia with conidia	Leaves	Leaf spot
8	*Ascochyta laurina* E. Tasii	Pycnidia with oval conidia	Leaves, shoots	Necrotic lesions
9	*Diplodia laurina* Sacc. et Pass.	Pycnidia with two-celled conidia	Shoots, bark	Shoot rot
10	*Alternaria tenuissima* Ness	Chain-forming septate conidia	Leaves	Leaf spot

Conclusion

The analysis of the literature sources and our own investigations showed that bay laurel is susceptible to a wide range of diseases, predominantly of fungal and oomycete origin [10]. The most dangerous among them are anthracnose, macrophomosis, southern root rot, and phytophthora root rot, which may lead to significant product losses.

It has been established that the climatic conditions of the Lankaran region favor the development of phytopathogens.

As a result of the comprehensive study of the mycobiota associated with diseases of bay laurel, a large volume of factual material on the species composition of diseases and the distribution of individual diseases has been collected for the first time.

The conducted research revealed more than 10 pathogens affecting bay laurel, including southern root rot, brown leaf spot (anthracnose), macrophomosis, powdery mildew, verticillium wilt, necrotic spots, shoot rot, root collar rot, and others.

The identified pathogens include: *Verticillium albo-atrum* Reinke et Berth.; *Colletotrichum nobile* Sacc. = *Glomerella cingulata* (Ston.) Shr. et Sp.; *Oidium passerinum* Bertn.; *Macrophoma georgica* Ket.; *Sclerotium rolfsii* Sacc.; *Phytophthora cinnamomi* Rands; *Fusarium oxysporum* (Schlecht.) Snyd. et Hans.; *Cercospora unicolor* Sacc. et Pens.; *Phyllosticta lauri* Nest.; *Phyllosticta nobilis* Thüm.; *Phyllosticta laurela* Sacc.; *Ascochyta laurina* E. Tasii; *Diplodia laurina* Sacc. et Pass.; *Phoma laurela* Sacc.; *Cladosporium herbarum* (Pers.) Link; and *Alternaria tenuissima* Ness.

In the future, we plan to continue studying the species composition of the phytopathogenic mycobiota of bay laurel.

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LƏNKƏRAN BÖLGƏSİ ŞƏRAİTİNDƏ DƏFNƏ (*LAURUS NOBILIS* L.) XƏSTƏLİKLƏRİNƏ SƏBƏB OLAN TÖRƏDİCİLƏRİN NÖV TƏRKİBİ

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Xülasə

Bu məqalədə uzun illər ərzində nəcib dəfnə (*Laurus nobilis* L.) bitkisinə zərər vuran xəstəliklər üzrə aparılmış tədqiqatların nəticələri təhlil olunur. Talış aqroiqlim zonasında nəcib dəfnə bitkisinin mikobiotasının kifayət qədər öyrənilməməsi və onlara qarşı elmi əsaslandırılmış mübarizə tədbirlərinin olmaması patogenlərin növ tərkibinin müəyyənləşdirilməsini zəruri etmişdir. Tədqiqatın əsas məqsədi nəcib dəfnə bitkisinin mikobiotasını öyrənmək, ən geniş yayılmış və yüksək zərərvericilik xüsusiyyətinə malik növləri aşkar etmək, həmçinin onlara qarşı tədbirlər sistemini işləyib hazırlamaqdan ibarət olmuşdur.

Tədqiqatlar 2021–2024-cü illərdə Lankaran-Astara region ərazisində yerləşən fərdi bağ təsərrüfatlarında aparılmışdır. Lənkəran–Astara bölgəsində nəcib dəfnə bitkisinin xəstəlik törədicilərinin növ tərkibinin öyrənilməsi məqsədilə marşrut müayinələri ilk dəfə tərəfimizdən həyata keçirilmişdir. Tədqiqatlar K. M. Stepanov və A. E. Çumakov (1972), A. E. Çumakov, İ. İ. Minkeviç, Y. İ. Vlasov və E. A. Qavrilova (1974) tərəfindən təklif olunmuş metodikalar əsasında aparılmışdır. Xəstəlik törədicisi olan göbələklərin identifikasiyası zamanı müxtəlif klassik və müasir identifikasiya üsullarından istifadə edilmişdir (N. A. Naumov, 1937; S. V. Vasilyeva, 1974; A. E. Çumakov, Y. İ. Vlasov, 1979; P. N. Qolovin və b., 2002).

Nəcib dəfnə bitkisinin xəstəliklərinin mikobiotasının kompleks tədqiqi nəticəsində ilk dəfə xəstəliklərin növ tərkibi və ayrı-ayrı xəstəliklərin yayılma səviyyəsinə dair geniş faktiki material toplanmışdır. Aparılmış tədqiqatlar nəticəsində dəfnə bitkisində 10-dan çox xəstəlik törədicisi aşkar edilmişdir. Bunlara cənub kök çürüməsi, qəhvəyi yarpaq ləkəliliyi (antraknoz), makrofomoz, unlu şeh, soluxma, nekrotik ləkələnmələr və digər xəstəliklər daxildir.

Müəyyən edilmişdir ki, ümumi mikobiotaya daxil olan 10 növ bölgədə yetişən nəcib dəfnə bitkisinin mikobiotası üçün yeni növlər hesab olunur.

Açar sözlər: nəcib dəfnə, Laurus nobilis, zərərliliyi, fitopatogen mikroorqanizmlər, xəstəliklər, zədələnmə dərəcəsi, bioloji xüsusiyyətləri, solma

ВИДОВОЙ СОСТАВ ВОЗБУДИТЕЛЕЙ БОЛЕЗНЕЙ ЛАВРА БЛАГОРОДНОГО (LAURUS NOBILIS L.) В УСЛОВИЯХ ЛЯНКЯРАНСКОГО РЕГИОНА

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Резюме

В данной статье анализируются результаты многолетних исследований заболеваний, наносящих вред благородному лавру (*Laurus nobilis* L.). Недостаточная изученность микобиоты благородного лавра в Талышской агроклиматической зоне, а также отсутствие научно обоснованных мер борьбы с ними обусловили необходимость определения видового состава патогенов. Основной целью исследования являлось изучение микобиоты благородного лавра, выявление наиболее широко распространённых и наиболее вредоносных видов, а также разработка системы мероприятий по борьбе с ними.

Исследования проводились в 2021–2024 гг. в индивидуальных садовых хозяйствах Лянкярано-Астаринской зоне. Маршрутные обследования по изучению видового состава возбудителей заболеваний благородного лавра в Лянкярано-Астаринской зоне впервые были проведены нами. Исследования выполнялись по методикам К. М. Степанова и А. Е. Чумакова (1972), А. Е. Чумакова, И. И. Минкевича, Ю. И. Власова и Е. А. Гавриловой (1974). При идентификации грибов — возбудителей болезней — использовались различные классические и современные методы определения (Н. А. Наумов, 1937; С. В. Васильева, 1974; А. Е. Чумаков, Ю. И. Власов, 1979; П. Н. Головин и др., 2002).

В результате комплексного изучения микобиоты болезней благородного лавра впервые собран обширный фактический материал о видовом составе заболеваний и степени распространения отдельных болезней. В ходе исследований у растения лавра было выявлено более 10 возбудителей заболеваний. К ним относятся южная корневая гниль, бурая пятнистость листьев (антракноз), макрофомоз, мучнистая роса, увядание, некротические поражения и другие заболевания.

Установлено, что 10 видов, входящих в общую микобиоту, являются новыми для микобиоты благородного лавра, произрастающего в данном регионе.

Ключевые слова: благородный лавр, *Laurus nobilis*, вредоносность, фитопатогенные микроорганизмы, болезни, степень поражения, биологические особенности, увядание

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