



**PROCEEDINGS OF II.
INTERNATIONAL
BIOLOGICAL & LIFE
SCIENCES CONGRESS
BIOLIC 2024**

30 OCTOBER - 1 NOVEMBER, 2024

Megasaray Westbeach Hotel, Antalya, Turkey



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**Organized by
Trakya University
International Researchers Association**

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WELCOME NOTES

You are welcome to our II. International Biological and Life Sciences Congress (BIOLIC) which is organized by Trakya University and the International Researchers Association. The congress will be held in Megasaray Westbeach Hotel, Antalya, Turkey, on 30 October – 1 November, 2024 will be normal as well as with online participation.

Our meeting is a premier international science, technology and business forum focusing on Agriculture, Biology and Life Sciences. The program will include oral talks by invited prominent scientists and oral and e poster presentations by participants in selected topics. The Congress is intended that the subjects to be kept broad in order to provide opportunity to the science and research community to present their works as oral or poster presentations in a friendly environment of Antalya, Turkey to share their knowledge and experience and benefit from each other.

The first meeting has been organized in Lviv, Ukraine in 2019 by Trakya University, with part of more than 200 participants from all over the world with 376 scientific papers. The 2nd congress will gather scientists from around the world, and present their recent achievements. The attendees will have ample opportunities for learning, reconnecting, engaging and networking with colleagues from academia and industry as well as meeting with various exhibitors.

As there have been many different scientific meetings around the world, we aimed to bring three different communities together, namely science, research and private investment groups considering practical information sharing that is of value for researchers and scientists from around the world, in a friendly environment of Antalya, Turkey to share their knowledge and experience and benefit from each other as well as prospects to overcome the limitation for sustainable crop production to feed the world.

There are 38 orals and 63 poster presentation in the congress both joining and presenting normal and online with 141 participants from 20 different countries from the world.

With care for our nature and environment, we aim the green congress, meaning that as little as possible papers will be used. Abstract book is published in electronic book and is distributed to the participants by e mail for online participants. All the e-posters are prepared in electronic form and then submit to via the congress e mail and exhibited in electronical poster boards as well as in online e poster hall in our web page during the congress.

Congress Topics:

Agriculture, Forestry, Life Sciences, Agricultural Engineering, Aquaculture and Biosystems, Animal Science, Biomedical science, Biochemistry and Molecular Biology, Biology, Bioengineering, Biomaterials, Biomechanics, Biophysics, Bioscience, Biotechnology, Botany, Chemistry, Chemical Engineering, Earth Sciences, Environmental Science, Food Science, Genetics and Human Genetics, Medical Science, Machinery, Pharmaceutical Sciences, Physics, Soil Science.

We would like to thank all of you for joining this congress and we would like to give also special thanks to our sponsors and collaborators for giving us a big support to organize this event.

Prof Dr Yalcin KAYA
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“Greenhouse Gas (GHG) Emissions in Berry, Stone Fruits, Nuts and Citrus Production”

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EXAMINATION OF THE HEALTH SAFETY OF OAK SEEDS ORIGINATING FROM SEED SOURCES IN CENTRAL SERBIA

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ABSTRACT

The paper presents an examination of the presence of pathogenic fungi and insects on oak seeds collected from 13 areas in Central Serbia (Kucevo, Krusevac, Kraljevo, Boljevac, Beograd, Kragujevac, Uzice, Despotovac, Ivanjica, Nis, Kursumlija, Djerdap and Sabac). The presence of the following pathogenic fungi was identified in a low range – from 1.0 to 5.0%: *Botrytis cinerea* Pers., *Alternaria tenuis* Nees, *Cladosporium herbarum* (Pers.) Link, *Mucor racemosus* Bull., *Rhizopus nigricans* Ehrenb., *Thamnidium elegans* Link, *Trichothecium roseum* (Pers.) Link, *Fusarium* spp., *Penicillium* spp., *Aspergillus* spp., *Ciboria batschiana* (Zopf) N.F. Buchw., *Pestalotiopsis funerea* (Desm.) Steyaert, *Pestalotia hartigii* Tubeuf, *Cytospora intermedia* Sacc., *Gnomonia quercina* Kreb., *Phomopsis quercina* (Sacc.) Höhn. ex Died., *Gloeosporium quercinum* Westend., *Ophiostoma* spp. and sterile mycelium. Among the harmful insect species, the following were found on the examined seeds: *Curculio glandium* Marsham, 1802, *Curculio elephas* (Gyllenhal 1836), *Cydia simplana* (Hübner, 1799) and *Andricus quercus salicis* (Burgsdorf, 1783) in the range of only 1.0 do 4.0%. The species *Quercus rubra* showed the greatest resistance to the presence of the above-mentioned harmful agents, while the highest number of diseases and pests was found on the seeds of *Quercus petraea*, which may also be a consequence of the large number of samples. The results of these examinations indicate a satisfactory health condition of all the examined tree species, particularly regarding the presence of economically significant pathogenic fungi and harmful insects.

Keywords: Oak seeds, pathogenic fungi, insects, diseases, pests.

INTRODUCTION

The quality of seeds in terms of health condition must meet the conditions established by regulations on the health status of crops and facilities, seeds and planting material. The determination of the health status of seeds involves the examination of a seed sample from a batch of domestically produced seeds and imported seeds. The health status of seeds for declaration and marketing purposes is examined only for seed batches originating from crops that were monitored during the growing season and were not infected with quarantine or certain economically harmful plant diseases and pests, which is confirmed by a certificate of crop health status or a crop approval certificate.

The examination of seed health therefore aims to produce healthy seedlings and prevent the spread of plant diseases through the use of infected seeds. Numerous biotic and abiotic factors can negatively affect plant health and seed quality. Among the biotic factors, pathogenic fungi and harmful insects hold a significant place. Pathogenic fungi can be present on or in the seed, being either extraembryonic or intraembryonic, and can also be seed contaminants. Their transmission through seeds may cause local or systemic infections in plants. Some of the pathogenic fungi, such as *Alternaria sp.*, *Fusarium sp.*, *R. solani* etc., can cause seed diseases or be transmitted through seeds, but they are tolerated at low percentages.

Disease agents of forest seeds and fruits in production facilities - The occurrence and spread of diseases on forest seeds and fruits primarily depend on external factors, the place and method of collection, quality, processing methods, and storage conditions. Seeds are primarily infected if their seed coat is damaged. Seeds and fruits of forest trees can be infected by fungi, bacteria, or viruses. However, unlike mycoses, damages caused by viruses and bacteria are not economically significant. Fungi inhabit seeds and fruits both on the trees and later on, during processing and storage.

In practice, it is very difficult to prevent infections of seeds and fruits (cones) during their development on trees. For diseases that cause fruit deformities and seed mummification, it is recommended to isolate and destroy infected material, collect healthy fruits immediately after they fall, avoid mechanical damage during collection, transport, and cleaning, and to remove moldy fruits that serve as infection hotspots.

Disease agents of oak seeds in production facilities are: *Ciboria batschiana* (Zopf) N.F. Buchw. Synonym: *Stromatinia pseudotuberosa* (Rehm) Boud., *Pestalotiopsis funerea* (Desm.) Steyaert, *Pestalotia hartigii* Tubeuf, *Cytospora intermedia* Sacc., *Gnomonia quercina* Kreb., *Phomopsis quercina* (Sacc.) Höhn. ex Died., *Gloeosporium quercinum* Westend. and *Ophiostoma* spp.

Disease agents of forest seeds in storage facilities - Diseases of forest seeds in storage are most commonly caused by pathogenic fungi that cause mold. Mold appears in the following cases: if seed storage facilities are damp and poorly ventilated; if fresh seeds are dried in layers that are too thick; if seeds are not regularly mingled during drying; if seeds are insufficiently dried and stored as such; if seeds are damaged during harvesting, processing, or by insects. Large fruits with high moisture content are particularly sensitive: beech nuts, acorns, chestnuts, walnuts, hazelnuts, and others. If mold penetrates the interior of the seed, its germination rate decreases rapidly. Parasitic fungi from the genera *Alternaria*, *Botrytis*, *Fusarium*, *Pythium*, as well as saprophytic fungi from the genera *Aspergillus*, *Penicillium*, and others, which are often present on the seed surface, under certain conditions can penetrate not only to the cotyledons and endosperm of the seed, but also to its embryo. Disease can thus also occur during the seed germination phase, causing damping-off. Conifer seeds are particularly sensitive, and the most dangerous agents of damping-off are fungi from the genus *Fusarium*.

Disease agents of oak seeds in storage facilities are: *Botrytis cinerea* Pers., *Alternaria tenuis* Nees, *Cladosporium herbarum* (Pers.) Link, *Mucor racemosus* Bull., *Rhizopus nigricans* Ehrenb., *Thamnidium elegans* Link, *Trichothecium roseum* (Pers.) Link, *Fusarium* spp., *Penicillium* spp. and *Aspergillus* spp.

According to Mihajlovic Lj. (2008), the biggest problem with **seed pests** in our region is seen in oaks, beeches, ashes, spruces, pines, and firs. In oaks and beeches, the most common are seed-eating insects from the genera *Curculio*, *Pammene*, *Cydia* and *Andricus*; in ashes, the most common are insects from the genera *Lignyodes*, *Pseudargyrotoza* and *Contarinia*; in pines, insects from the genera *Pissodes*, *Dioryctria* and *Gravitar mata* prevail; in spruces, insects from the genera *Ernobius*, *Dioryctria*, *Cydia*, *Eupithecia*, *Kaltenbachiola*, *Plemeliella* and *Laziomma* are most commonly found; in firs, insects from the genera *Dioryctria*, *Megastigmus*, *Earomyia* and *Resseliella* are prevalent.

Among the mentioned pests, the most significant ones affecting germination, generative reproduction, and natural regeneration are Curculionidae and Tortricidae: *Curculio sp.*, *Cydia sp.*, *Eupithecia syn Pammene*, as well as gall wasps Cynipidae. Other pests appear in negligible percentages (Table 1). Among the weevil species that appear as larvae, the most significant are the oak weevil, hazelnut weevil, and chestnut weevil, which, in conjunction with others, can destroy an entire year's crop, completely consuming the future seedling. Even if the germination remains intact, by feeding on the cotyledons, spermatophagous insects leave the young plant without food, depriving it of any chance to develop normally in terms of height and thickness (ILDIS, accessed on June 22, 2024). In the forests of the Valjevo eparchy, sessile oak is particularly threatened in the Management Units Tronoša and Cer Vidojevica, as well as in the forests of other private owners in the Management Unit Cer Vidojevica.

MATERIAL AND METHOD

The health status of seeds indicates the presence or absence of quarantine and certain economically harmful plant diseases and pests identified for specific types of plants, according to the Rulebook on mandatory health inspections of crops and facilities, seeds, and planting materials of agricultural and forest plants. The health status of seeds for declaration and marketing purposes is tested only for seed batches originating from facilities that were monitored during the growing season and were not infected with quarantine and certain economically harmful plant diseases and pests, verified by a certificate of health status of crops and facilities. If the seed health examination detects a quarantine plant disease or a pest, the examination is discontinued. This finding is recorded in the seed health inspection report, and the seeds must not be used as seed material.

For the seed and young plant to develop smoothly, the seed must be free of diseases and pests within the allowed percentage. Seeds intended for production must meet the legally prescribed criteria outlined in the Regulation on lists of harmful organisms and Lists of plants, plant products, and regulated facilities ("Official Gazette of RS," nos. 7/2010 and 22/2012), which include lists of harmful organisms and lists of plants, plant products, and regulated facilities – Lists IA, IIA, IIIA, IVA, VA and VB.

For the purposes of conducting the experiment, the research was carried out in the accredited laboratory of the Institute for Forestry in Belgrade. The examination of the seed health status was determined according to the Rulebook on health inspection of crops and facilities for the production of seeds, seedlings, and planting material, and the health inspection of seeds, seedlings, and planting material ("Official Gazette of the Federal Republic of Yugoslavia", Nos. 66/99 and 13/2002, "Official Gazette of Serbia and Montenegro", Nos.

10/2003 and 13/2003, and " Official Gazette of the Republic of Serbia", Nos. 39/2006, 59/2006, 115/2006, 119/2007 and 107/2008).

The examinations were conducted using accredited methods for deciduous tree seeds prescribed by the Institute for Standardization of Serbia: SRPS D.Z1.138:1971 and SRPS D.Z1.139:1971. The validity of the methods used is periodically verified through MLI activities – interlaboratory testing.

Sampling of seeds is done by hand for seeds that are not free-flowing, ensuring that the hand is clean and dry. If the sample is taken by hand (individual sample) from packaging deeper than 40 cm, the seeds are poured onto an appropriate mat and a certain number of samples are taken, and the seeds are then returned to the packaging and properly sealed. When extracting the sample, the hand must be tightly closed to prevent the sample contents from falling out.

The health status of seeds is examined using scientifically accepted and professionally verified methodological procedures adapted for specific plant diseases and pests. The corresponding laboratory report specifies the method applied. Pre-treatment refers to any physical or chemical processing of the working sample before incubation, which facilitates the examination. Seed treatment entails any physical or chemical treatment of the entire seed fraction (specifying the method of treatment and the type of chemical and other substances used for treatment of seeds). Depending on the testing methods, the working sample may consist of the entire average sample or a part of it. If a larger average sample than the prescribed one is required, the person taking the sample will be informed. The working sample for this purpose is most often obtained from an average sample and should contain more than 400 seeds of the primary species or an appropriate mass of seeds from the average sample. In the case of a complaint, a certain number of seeds are randomly selected and re-examined. The result of the seed health examination is expressed as a percentage of diseased seeds or as the number of found organisms (pests) in the quantity of the tested sample, which is entered into the laboratory report and the appropriate declaration for the given seed batch. The maximum allowed percentage or number of economically harmful plant diseases and pests is given in the regulations of the Rulebook on mandatory health inspection of crops and facilities, seeds, and planting material of agricultural and forestry plants.

For testing the presence of fungi, the working sample consists of seeds that are disinfected three times in a 3% hydrogen peroxide (H₂O₂) solution for 2 minutes, then rinsed with distilled water and dried on filter paper. The seeds are placed in 90 mm diameter petri dishes that have been previously sterilized in an autoclave, using malt agar and filter paper soaked with distilled water until fully saturated as the medium. The number of seeds per sample depends on the seed size. Incubation is done in a thermostat at 22°C in complete darkness for up to 14 days, depending on the culture. Examination of the developed fungal cultures around the seeds is performed with a microscope, and based on the morphology of the conidia, fungal genera are identified according to (Nelson et al., 1983; Burgess et al., 1994; Watanabe, 1994). The results of the health status examination are expressed as the percentage of infected seeds.

For the examination of the presence of pests, no prior treatment of the seeds is necessary, and pests are identified based on standard entomological methods, which depend on the size of the seeds. Fifty seeds are selected and dissected under a stereomicroscope, and within this number, visible exit holes are also counted. Seeds may contain larvae of seed predators (such as Curculionidae), their parasitoids, and similar organisms. Using this method, the average

value for two main categories is obtained for the selected 50 dissected seeds: 1) healthy seeds and 2) seeds with various categories of damage identified through dissection with a scalpel and tweezers.

Methods for seed testing are subject to change and evolve in accordance with scientific knowledge. Following global trends, the examiners at the Laboratory of the Institute for Forestry modify the methods for seed testing, which allows for the production of high-quality seeds and planting material.

RESULTS AND DISCUSSION

Seeds are a very suitable substrate for the maintenance and spread of disease-causing agents and pests, which is why seed health control is a necessary preventive measure in combating the spread of economically significant fungi and insects. The result of the seed health examination is expressed as a percentage of diseased seeds or as the number of found organisms (pests) in the quantity of the tested sample, which is recorded in the laboratory report and in the appropriate declaration for the corresponding seed batch. If it is determined that the seeds are multiply infected during incubation, only the average percentage of infection is reported. The maximum allowed percentage or number of economically harmful plant diseases and pests (standards) is given in the regulations of the Rulebook on mandatory health inspection of crops and facilities, seeds, and planting material of agricultural and forestry plants.

Special examinations of seed health: the microflora of seeds (batch or sample) can change significantly during seed storage under environmental conditions that are satisfactory for maintaining seed viability. For instance, saprophytic microflora can be an indication of poor seed quality due to unfavorable conditions during harvest, processing, storage, or seed aging. Seed testing may yield results different from those declared. Deviations (tolerances) are allowed between the declared quality and the re-examination conducted by an authorized organization—within limits of up to a 2.0% difference, i.e. allowed deviation.

In the region of Central Serbia, oak seed samples from the Register of seed facilities for the production of selected planting material were examined. The examination covered a total of 27 seed facilities with the following species: *Quercus petraea* (13 facilities), *Q. frainetto* (9 facilities), *Q. robur* (3 facilities), and *Q. rubra* (2 facilities).

The examined facilities are located in areas managed by the forestry management units of Belgrade (8 facilities), Kragujevac (3 facilities), Boljevac (2 facilities), Kruševac (2 facilities), Kraljevo (2 facilities), Despotovac (1 facility), Ivanjica (1 facility), Užice (1 facility), Kuršumlija (1 facility), Kučevo (1 facility) and Niš (1 facility), then in Djerdap National Park (3 objekta) and the Eparchy of Sabac (1 facility) - Table 1.

Table 1. Detected diseases and pests on oak seeds collected from seed facilities

No.	Oak species	Area	Location	Detected diseases and % of infection	Detected pests and % of attack
1	<i>Quercus petraea</i>	Kragujevac	Rudnik	<i>Botrytis cinerea</i> Pers. (2%) <i>Mucor racemosus</i> Bull. (1%) <i>Ciboria batschiana</i> (Zopf) N.F. Buchw (1%)	<i>Curculio glandium</i> Marsham, 1802. (3%) <i>Cydia semplana</i> (Hübner, 1799) (1%)
2	<i>Quercus petraea</i>	Despotovac	Juhor	<i>Alternaria tenuis</i> Nees (1%) <i>Rhizopus nigricans</i> Ehrenb. (1%)	<i>Curculio glandium</i> Marsham, 1802. (4%)
3	<i>Quercus petraea</i>	Ivanjica	KO Rokci	<i>Cladosporium herbarum</i> (Pers.) Link (2%) <i>Cytospora intermedia</i> Sacc. (1%)	<i>Curculio glandium</i> Marsham, 1802. (3%)
4	<i>Quercus petraea</i>	Eparchy of Sabac	Cer Vidojevica	<i>Mucor racemosus</i> Bull. (5%) <i>Thamnidium elegans</i> Link (2%)	<i>Curculio elephas</i> (Gyllenhal 1836) (2%) <i>Cydia semplana</i> (Hübner, 1799) (1%)
5	<i>Quercus petraea</i>	Kučevo	Ujevac	<i>Botrytis cinerea</i> Pers. (3%) <i>Pestalotia hartigii</i> Tubeuf (2%)	<i>Cydia semplana</i> (Hübner, 1799) (2%)
6	<i>Quercus petraea</i>	Djerdap	Zlatica	<i>Botrytis cinerea</i> Pers. (1%) <i>Gnomonia quercina</i> Kreb. (2%) <i>Ophiostoma</i> spp. (2%)	<i>Curculio elephas</i> (Gyllenhal 1836) (1%) <i>Andricus quercuscalicis</i> (Burgsdorf, 1783) (1%)
7	<i>Quercus petraea</i>	Djerdap	Zlatica	<i>Cladosporium herbarum</i> (Pers.) Link (3%)	<i>Cydia semplana</i> (Hübner, 1799) (2%)

8	<i>Quercus petraea</i>	Djerdap	Boljetinska reka	<i>Cladosporium herbarum</i> (Pers.) Link (1%) <i>Aspergillus</i> spp. (2%)	<i>Curculio glandium</i> Marsham, 1802 (4%)
9	<i>Quercus petraea</i>	Belgrade	Avala	-	<i>Curculio glandium</i> Marsham, 1802. (4%)
10	<i>Quercus petraea</i>	Belgrade	Avala	<i>Mucor racemosus</i> Bull. (2%)	<i>Curculio elephas</i> (Gyllenhal 1836) (2%)
11	<i>Quercus petraea</i>	Boljevac	Crni Vrh	-	<i>Curculio glandium</i> Marsham, 1802. (4%) <i>Cydia amplana</i> Hübner, 1799. (1%)
12	<i>Quercus petraea</i>	Kuršumljica	Mali Jastrebac	<i>Rhizopus nigricans</i> Ehrenb. (1%) <i>Gloeosporium quercinum</i> Westend. (1%) <i>Cytospora intermedia</i> Sacc. (1%)	<i>Cydia simplana</i> (2%) <i>Cydia amplana</i> (Hübner, 1799.) (1%)
13	<i>Quercus petraea</i>	Kraljevo	Sokolja	<i>Trichothecium roseum</i> (Pers.) Link (2%)	<i>Curculio glandium</i> Marsham, 1802. (3%)
14	<i>Quercus frainetto</i>	Belgrade	Lipovica	-	<i>Curculio elephas</i> Gyllenhal 1836. (1%)
15	<i>Quercus frainetto</i>	Belgrade	Guberevačke šume	<i>Alternaria tenuis</i> Nees (2%) <i>Pestalotia hartigii</i> Tubeuf (1%)	<i>Curculio glandium</i> Marsham. 1802. (4%)
16	<i>Quercus frainetto</i>	Boljevac	Stol	<i>Botrytis cinerea</i> Pers. (5%) <i>Pestalotiopsis funerea</i> (Desm.) Steyaert (3%)	<i>Curculio elephas</i> Gyllenhal 1836. (2%)
17	<i>Quercus frainetto</i>	Niš	Obla Glava	<i>Botrytis cinerea</i> Pers. (2%)	<i>Curculio glandium</i> Marsham, 1802. (2%) <i>Pammene</i> sp. (1%)

				<i>Phomopsis quercina</i> (Sacc.) Höhn. ex Died. (2%)	
18	<i>Quercus frainetto</i>	Kuršumlija	Mali Jastrebac	-	<i>Cydia amplana</i> Hübner, 1799. (2%)
19	<i>Quercus frainetto</i>	Kraljevo	Kotlenik	-	<i>Cydia amplana</i> Hübner, 1799. (1%)
20	<i>Quercus frainetto</i>	Kruševac	Župske šume	<i>Alternaria tenuis</i> Nees (1%) <i>Ophiostoma</i> spp. (1%)	<i>Curculio glandium</i> Marsham, 1802. (4%)
21	<i>Quercus frainetto</i>	Kragujevac	Bukulja	<i>Botrytis cinerea</i> Pers. (2%) <i>Pestalotia hartigii</i> Tubef (1%)	<i>Curculio glandium</i> Marsham, 1802. (3%)
22	<i>Quercus frainetto</i>	Užice	Smišalj	<i>Penicillium</i> spp. (1%)	<i>Curculio glandium</i> Marsham, 1802. (3%)
23	<i>Quercus robur</i>	Kragujevac	Rogot	<i>Fusarium</i> spp. (1%)	<i>Curculio glandium</i> Marsham, 1802. (3%)
24	<i>Quercus robur</i>	Belgrade	Progar	<i>Alternaria tenuis</i> Nees (3%)	-
25	<i>Quercus robur</i>	Belgrade	Bojčin	<i>Mucor racemosus</i> Bull. (2%)	<i>Cydia simplana</i> (Hübner, 1799) (3%)
26	<i>Quercus rubra</i>	Belgrade	Košutnjak	-	-
27	<i>Quercus rubra</i>	Belgrade	Guberevačke šume	-	<i>Curculio glandium</i> Marsham, 1802. (2%)

In accordance with the above-mentioned Rulebook, and based on the tests presented in this paper and shown in Table 1, it can be seen that the seeds of all the listed oak species have a satisfactory health status concerning the presence of pathogenic fungi and insects. The species *Quercus rubra* showed the highest resistance to the presence of the mentioned harmful agents, while the most diseases and pests were detected on the seeds of *Quercus petraea*, which could also be a consequence of the large number of samples.

CONCLUSIONS

In the tested seed samples of four oak species (*Quercus petraea*, *Q. robur*, *Q. frainetto*, and *Q. rubra*) originating from 27 seed facilities across 13 areas in Central Serbia, the following diseases were detected: *Botrytis cinerea* Pers., *Alternaria tenuis* Nees, *Cladosporium herbarum* (Pers.) Link, *Mucor racemosus* Bull., *Rhizopus nigricans* Ehrenb., *Thamnidium elegans* Link, *Trichothecium roseum* (Pers.) Link, *Fusarium* spp., *Penicillium* spp., *Aspergillus* spp., *Ciboria batschiana* (Zopf) N.F. Buchw, *Pestalotiopsis funerea* (Desm.) Steyaert, *Pestalotia hartigii* Tubeuf, *Cytospora intermedia* Sacc., *Gnomonia quercina* Kreb., *Phomopsis quercina* (Sacc.) Höhn. ex Died., *Gloeosporium quercinum* Westend., and *Ophiostoma* spp., with an attack intensity ranging from 1.0% to 5.0%. Among the pests detected were: *Curculio glandium* Marsham, 1802, *Curculio elephas* (Gyllenhal 1836), *Cydia simplana* (Hübner, 1799), and *Andricus quercus salicis* (Burgsdorf, 1783), with a range of 1.0% to 4.0%, hence all below the threshold of harmfulness.

According to the criteria of the Rulebook on the mandatory health inspection of crops and facilities, seeds, and planting material of agricultural and forest plants, and based on the tests presented in this paper, it can be concluded that the seeds of all the listed oak species have a satisfactory health status concerning the presence of pathogenic fungi and insects. The species *Quercus rubra* showed the highest resistance to the presence of the mentioned harmful agents, while the most diseases and pests were detected on the seeds of *Quercus petraea*, which could also be a consequence of the large number of samples.

The results of these tests indicate a satisfactory health status of all the examined tree species, particularly concerning the presence of economically significant pathogenic fungi and harmful insects.

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