

Mycology

A New Record of the Rare Fungus *Grifola frondosa* (Dicks.) Gray in Georgia

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(Presented by Academy Member Guram Aleksidze)

Grifola frondosa (Dicks.) Gray, commonly known as hen-of-the-woods or maitake ("dancing mushroom" in Japanese), is a polypore mushroom that grows at the base of old-growth hardwood trees (most frequently *Quercus* sp). It is distributed in temperate areas of the northern hemisphere, ranging from Europe to North America, Japan, and China. This is an edible fungus with high nutritional and medicinal value. A new locality of this rare species, *G. frondosa* was reported in Georgia in October 2023. During the exploration expeditions, the fungus was found in the region of Guria, vlg. Shroma (Western Georgia). Until now, this species has been recorded in Georgia only in 3 regions (Abkhazia, Kakheti, Samtskhe-Javakheti). We had only literary records and lacked herbarium specimens available. The fungus was identified by macrochemical tests and morphological peculiarities using keys for fungal identification. The identified fungus and fungal isolate have been stored at the Fungarium of the Agricultural University of Georgia. The paper provides the macro and micromorphological features of the collected specimens, habitat, general distribution, and original illustrations. © 2024 Bull. Georg. Natl. Acad. Sci.

polyporales, *Grifola frondosa*, morphology, distribution

The genus *Grifola* (Grifolaceae, Polyporales, Agaricomycetes, Basidiomycota) consists of nine species. Among them, only *Grifola frondosa* (Dicks.) Gray is recorded in Georgia. This is a rare, lignicolous fungus inhabits on the bases of old deciduous living trees or stumps and rotting wood, mainly oak but also other hardwoods, rarely and conifers [1]. According to literature data in Georgia, the fungus is noted on *Ulmus* sp. and *Carpinus* sp. [2, 3].

In many European countries, this mushroom species is included in the national red-listed under the near threatened. *G. frondosa* is under threat of declining primarily due to deforestation and uncontrolled logging in mature forests. Overharvesting of wild edible mushrooms may be a threat. Re-establishment of the cultivated mycelia of non-native populations poses a potential threat to the environment. Since *G. frondosa* is widely cultivated and its strains of diverse geographic

origins are maintained in various culture collections worldwide, they can be used in *ex-situ* conservation [4].

Due to data deficiency, it is not possible to assess the status of *G. frondosa* in Georgia according to the Global Red List categories. We have only literary records, herbarium specimens are missing and records of previous authors did not include information on the substrate, date of collection, etc. According to literature records, personal field observations, and data published *G. frondosa* occurs in 4 regions of Georgia: Kakheti, Abkhazeti, Guria, and Samtskhe-Javakheti.

Materials and Methods

During the exploration expeditions the specimen was spotted on more than 100-year-old *Castanea sativa* Mill. in the region of Guria, in the yard of a resident.

Basidiospores were observed in the lab by light microscopy on an Amscope TE 720 Q microscope. A small piece of material was examined in Melzer's iodine reagent (2% Cotton Blue) and 5% KOH. Spores size are based on measurements of 20 randomly selected spores (including the smallest and largest). Various keys were used for species identification [5-7]. A pure culture of the fungus was isolated on PDA (Potato Dextrose Agar) media by culturing the piece of the fruiting body of the fungus.

Results and Discussion

The rare macromycete *Grifola frondosa* was collected in the fall of 2023, in the region of Guria, municipality Ozurgeti, vlg. Shroma, in the yard of a local resident (Fig. 1). The collected specimen is deposited in the Fungarium of the Agricultural University of Georgia (number of the specimen AUMH00019363).

Macro- and micro-morphological peculiarities of the collected sample and its distribution in Georgia and the world were described below:

Grifola frondosa (Dicks.) Gray, Nat. Arr. Brit. Pl. (London) 1: 643 (1821) – Grifolaceae, Polyporales, Incertae sedis, Agaricomycetes, Agaricomycotina, Basidiomycota, Fungi[8].

Bas.: *Boletus frondosus* Dicks. 1785.

Syn.: *Agaricus frondosus* (Dicks.) Schrank, Baier. Fl. (München) 1: 159 (1786); *Boletus frondosus* Dicks., Fasc. pl. crypt. brit. (London) 1: 18 (1785); *Caloporus frondosus* (Dicks.) Quél., Fl. mycol. France (Paris): 406 (1888); *Cladodendron frondosum* (Dicks.) Lázaro Ibiza, Revta R. Acad. Cienc. exact. fis. nat. Madr. 14(12): 864 (1916); *Cladomeris frondosa* (Dicks.) Quél., Enchir. fung. (Paris): 168 (1886); *Merisma frondosum* (Dicks.) Gillet [as 'frondosus'], Hyménomycètes (Alençon): 692 (1878); *Polypilus frondosus* (Dicks.) P. Karst., Revue mycol., Toulouse 3 (no. 9): 17 (1881); *Polyporus frondosus* (Dicks.) Fr., Syst. mycol. (Lundae) 1: 355 (1821); for other synonymies, see Species Fungorum [9].

Description: The fruit body is bushy, fleshy, 30-45 cm in diameter and weighs up to 10 kg. At the base there is a short thick stump, from which branching of multiple flattened light cream legs extend, gradually turning into fan-shaped caps. Individual caps 3–14 cm diameter, up to 1 cm thick, leaf-shaped or tongue-shaped, surface dry, velvety, looks like wavy wrinkled lobes of light to dark gray-brown with concentric zones, darker at the edges, lighter in the center. Hymenophore poroid, decurrent to the stem often nearly to the base, white, with age staining yellowish, pores are rounded or angular, 2-4 per mm, tubes 1-3 mm deep, with a straight edge at first, later jagged, unchanging color when damaged. The flesh is white, fleshy, and fibrous, with a pleasant smell and taste, later it becomes hard and bitter, unchanging color when damaged, KOH reaction negative. Spore print white. Spores broadly ellipsoidal, pointed on one side, smooth, 5-7 x 3.5-5µm, with one large oil droplet (Fig. 1).



Fig. 1. Fruit body and hymenium of *Grifola frondosa*.

On a PDA media it was grown white fluffy mycelium. Mycelium didn't change the color of the growth medium. (Fig. 2) Isolated fungus was stored at the culture collection of the Agricultural University of Georgia.

Habitat: A single mature basidioma was found growing at the base of old living *Castanea sativa* Mill. As a facultative parasitic or saprotrophic fungus, *G. frondosa* is capable of degrading lignin components of woody substrates, thus causing white rot or butt rot of tree stems or roots [1].

New records: Georgia, Region Guria, Ozurgeti Municipality, Vlg. Shroma, N41.979803 E41.840272, alt. 80 m, 18 October 2023, Leg. Revaz Doborjginidze (AUMH 00019363).

Previous collections in Georgia: *Polypilus frondosus* (Fr.) Karst. – Kakheti Region, Lagodekhi Municipality, Lagodekhi Nature Reserve, the way to the sulfur springs; on the elm (*Ulmus sp.*); It grows near the root collar of long-lived beech,

hornbeam, oak, elm and chestnut as a parasite. Causes yellow peripheral rot [2].

Polypilus frondosus (Fr.) P. Karst. – Samtskhe-Javakheti Region, Borjomi, Likani, alt. 950 m, on a *Carpinus caucasica* Grossh., 25.08.1909, Leg. A. Bondarzew [3, 10, 11].

Polyporus frondosus (Fr.) Fr. – Samtskhe-Javakheti Region, Daba Bakuriani, Bakuriani Alpine Botanical Garden, 21.09.1920, N. Voronikhin [12].

Polyporus frondosus Fr. – Abkhazeti Region, Gudauta Municipality, Tsebelda; Kakheti Region, Lagodekhi Municipality, Lagodekhi, Leg. A. Iachevski, on a tree trunk [13].

Polyporus frondosus Fr. – Fruit bodies are large, up to 15-30 centimeters, branched, consisting of numerous enlarged caps; Separate cap 5-12 cm thick and 6-12 cm wide, fleshy, soft; Flesh white, brittle when dry. Damages mainly old trees. Kakheti Region, Lagodekhi Municipality, Lagodekhi nature reserve, Salesavi gorge, on walnut, *Juglans regia* L., 16.08.1944, Leg. M. Eristavi; Kakheti Region, Lagodekhi Municipality, Lagodekhi Ori, right bank, Sulfur springs road, *Ulmus sp.*, 19.08.1944, Leg. M. Eristavi; Kakheti Region, Lagodekhi Municipality, Mount Kochal-Dag, *Fagus orientalis* Lip. 22.08.1944, Leg. M. Eristavi [14, 15].

Note. It was not possible to verify the samples due to the lack of herbariums. Therefore, in the



Fig. 2. Pure culture of *Grifola frondosa* on potato dextrose agar.

event that *Polyporus frondosus* Fr. is cited in the record, we cannot say with confidence that the author really means *Grifola frondosa*, and not *Meripilus giganteus* (Pers.) P. Karst.

General distribution: Europe (Austria, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, North Macedonia, Montenegro, Netherlands, Norway, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine, United

Kingdom), Asia (Azerbaijan, China, Indian, Iran, Japan, Korea, Turkey), North America (Canada, USA), Australasia (Australia, New Zealand) [4, 5, 16, 17].

Further research will definitely increase the information on distribution of the rare fungal species in the country.

This research [FR-21-308] was supported by Shota Rustaveli National Science Foundation of Georgia (SRNSFG).

მიკოლოგია

იშვიათი სოკოს *Grifola frondosa* (Dicks.) Gray-ს ახალი გავრცელების ადგილი საქართველოში

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**საქართველოს აგრარული უნივერსიტეტი, მიკოლოგიის და მცენარეთა პათოლოგიის ლაბორატორია, თბილისი, საქართველო

(წარმოდგენილია აკადემიის წევრის გ. ალექსიძის მიერ)

Grifola frondosa (Dicks.) Gray (რომელიც ასევე ცნობილია, როგორც ტყის ქათამი, მაიტაკე, ანუ იაპონურად – „მოცეკვავე სოკო“) არის ახედა სოკო, რომელიც იზრდება ასაკოვანი ფოთლოვანი ხეების, უპირატესად, მუხის ძირში. იგი გავრცელებულია ჩრდილოეთ ნახევარსფეროს ზომიერ სარტყელში. ევროპიდან ჩრდილოეთ ამერიკამდე, იაპონიასა და ჩინეთში. ეს არის საკვები სოკო, მაღალი კვებითი და სამკურნალო ღირებულებებით. ევროპის ბევრ ქვეყანაში ეს სახეობა შეტანილია ეროვნულ წითელ ნუსხაში, როგორც გადაშენების პირას მყოფი სახეობა. ამ იშვიათი სახეობის, *G. frondosa*-ს ახალი გავრცელების ადგილი დაფიქსირდა საქართველოში, 2023 წლის ოქტომბერს, კვლევითი ექსპედიციების დროს გურიის რეგიონში, სოფ.

შრომში (დასავლეთ საქართველო). დღემდე ეს სახეობა საქართველოში დაფიქსირებული იყო მხოლოდ 3 რეგიონში (აფხაზეთი, კახეთი, სამცხე-ჯავახეთი), გვექონდა მხოლოდ ლიტერატურული ჩანაწერები და არცერთი საჭერბარიუმო ნიმუში. სახეობის იდენტიფიკაცია მოხდა მაკროქიმიური ტესტებით და მორფოლოგიური ნიშნებით, სხვადასხვა სარკვევის გამოყენებით. სოკოს საჭერბარიუმო ნიმუში და მისი წმინდა კულტურა ინახება საქართველოს აგრარული უნივერსიტეტის ფუნგარიუმში. ნაშრომში მოცემულია შეგროვებული ნიმუშების მაკრო- და მიკრომორფოლოგიური მახასიათებლები, ჰაბიტატი, ზოგადი გავრცელება და ორიგინალური ილუსტრაციები.

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Received February, 2024