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Gubanova T.B. Stem and leaf succulents with contrasting frost-resistance level: accumulation peculiarities of some biologically active substances // Bull. of the State Nikit. Botan. Gard. – 2015. – № 115. – P. 54-58.

The article presents dynamics results of ascorbic acid and phenol compounds storage in tissue of cultivars of *Sedum*, *Opuntia* and *Cylindropuntia* genera with contrasting frost-resistance level. It was found out that cultivars with a high resistance to low temperature have synthesis of phenol compounds and ascorbic acid activated as soon as cold season begins. Perhaps these substances participate in protective mechanisms under conditions of low-temperature stress.

Key words: *frost-resistance; succulents; ascorbic acid; phenol compounds.*

MYCOLOGY

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NEW FUNGAL SPECIES INHABITING ON *DAPHNE TAURICA* KOTOV (THYMELAEACEAE) IN THE CRIMEA

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Introduction

Daphne taurica Kotov is an endemic plant of the Crimea. It is a deciduous shrub 40-80 sm (120 sm), stems in the bottom part can reach 28 mm across diameter. Bark on stems and lower branches is dark-brown, last-year`s branches have dark-purple color, shoots of the current year are greenish. Leaf length makes 4-48 mm, width – 2-10 mm. Leaves are sessile, bare, leathery, quite hard, oblong - inversely egg-shaped, edges are folded, bottom is wedge-shaped short (large leaves) oblong without visible footstalk. Flowers are aromatic, yellow-white or cream-colored by length of 1-3 sm, densely growing and shape heads (3-9 flowers) on the ends of short fruiting woods with thick foliage. Bloom period is in May-June. Fruits are dark red ripened drupes, young fruits have red color. Fruiting takes place in August [2, 4, 5].

Daphne taurica Kotov prefers sod-brown soils, formed on limestones of Jurassic period, characterized by poor alkaline reaction (pH=7,5). It is found in light forest with density of 0,2 mixed with meadow-steppe and petrophyte elements, which belong to association *Laserpitio-hispodi-Quercetum petrae*, *Quercu-Carpinifolia betuli* order, and in shrub aggregations of *Rhamno-Prunetea* class.

Two localities were found being included into three cenoses of 17, 42 and 2m². Population size is relatively 157, 75 and 24 specimens, totally – 256 plants. The first locality with area of 0,5 ha is situated on the right bank of the river Bolshaya Burulcha, among limestones, exposed on the plateau surface, where strata steeply directed to North, as numerous rocks uncover on the surface of slopes forming caves, cliffs and screes. *Daphne taurica* Kotov growing here forms small branchy bushes, diffused among herbaceous and shrub cenoses, mainly in well-illuminated areas. The second locality is situated on the left slope of the river (Bolshaya Burulcha) valley. This slope begins 200 m higher than broom Gniloy mouth and spreads 800-900 m down along the main valley. The slope is steep, stony with a number of limestone outcrops which cross it till the bottom of mountain range resembling ridges, cliffs of 30-40m and isolated peaks. *Daphne taurica* Kotov can be found along the very edges of rock, where illumination conditions are favorable; also some growths are found at the bottom of rocks covered by *Juniperus Sabina* [3].

Daphne taurica Kotov is a plant of RDBU [2], ERL (V) [7].

It was described as a new species in 1970 that's why data of fungi weren't presented at all.

Objects and research methods

The author investigated population of this species on "Mokrousov rocks" within two localities (Isikov, 2013). One of localities is situated at the foot of rocky steep before yaila area of the mountain, among light forest where the following group of plants grows: *Ligustrum vulgare*, *Rhamnus cathartica*, *Berberis vulgaris*, *Rosa spinosissima*, *Amygdalus nana*, *Acer campestre*, *Cotinus coggygria* and *Cornus*. On the area of 200 m² there were found 70 specimens; plants grow sparsely by single plants. Locality coordinates: n.l. 44°50'997", e.l. 34°25'815". The second locality is situated above the first one on yaila part of the mountain among growth of *Juniperus Sabina* and inside of its spacious cushions. On the area of 100 m² there were found 90 specimens. Locality coordinates: n.l. 44°51'014", e.l. 34°25'859". In terms of this study phytopathological inspection of all specimens and population was carried out, total number is 160 specimens. 20 patterns with mycological material were selected.

Results and discussion

New fungal species were found on leaves and shoots with different type of branching. These fungi have well-marked ecological niches according to organs and parts of plants, what is typical for symbiotic way of life. Fungi belong to the group of highly specialized biotrophic species, associated with a certain plant species. That is way we are sure to classify them as new fungal species.

Phyllosticta daphnae Isikov sp. nova

Maculatio effusa, raraest, maculae confluentes, amphigenae, ad 1 cm diam., sine marginatione sunt. Pycnidia gregaria, globosa, orbiculato-globosa, nigra, ad 100 μ diam. amphigena sunt. Conidiophora simplicia, recta, inramosa, angustata ad apices, 12-15 x 1.5-2 μ. sunt. Conidia decolorata, cylindrica, parve incurvata, 6-7(9) x 2-2.5 μ. sunt.

T y p u s: in Russia, regionis Crimeae, in declivibus montium, in parte superiore vallis fluminis Burulytsha locatasunt. In foliis *Daphne taurica* Kotov (Thymelaeaceae) occurrunt, 18.09.2013, V.P. Isikov, in Horto Botanico Nikitensis conservantur (Yalta).

Blotch is sparce, spots take place on both sides of a leaf, blend, 1 sm across diameter without bordering. Pycnidiums grow on both leaf sides in groups, have a globe and rounded-globe shapes, black, till 100 mkm across diameter. Conidium-baring parts are simple, straight, unbranched, tapered to the top, 12-15 x 1,5-2 mkm. Conidia are colourless, cylindric, lightly incurvate, 6-7(9) x 2-2,5 mkm (Fig.1).

Type: Russia, the Crimea, mountain slopes, upper part of the river Bolshaya Burulcha. Place of growth: leaves of *Daphne taurica* Kotov (Thymelaeaceae), 18.09.2013, V.P. Isikov. It is preserved in Nikitsky Botanical Gardens.

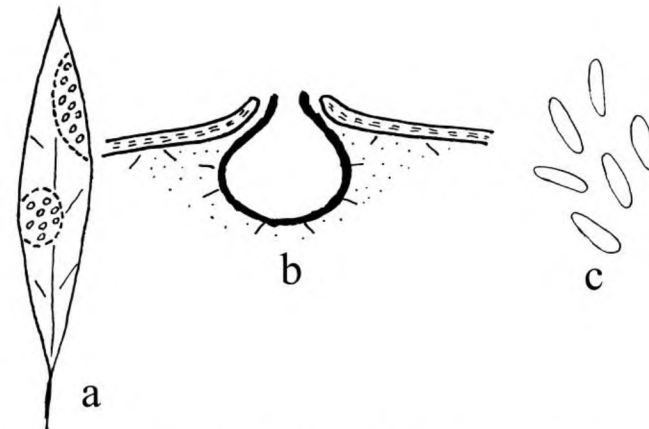


Fig. 1 Leaf damage by fungus *Phyllosticta daphnae* Isikov sp. nova (a), cross-section of the fungal fruit (b) and conidium (c)

***Phomopsis daphnae* Isikov sp. nova**

Pycnidia gregaria circulatim, immersa, 200-300 μ in diam. sunt. Apices obtusas conicasin faciem prominent, tunica picnidii nigratenuis, decolorata in medio est. Picnidia camera magna una aut pseudoloculosa plura habent. Conidiophora sumplicia, filiformia, 30-45 x 3-4 μ sunt. Conidia decolorata hyaline sunt, typiduo occurrunt: α -conidia elongato-ovalia, extremitates obtusae aut sub acuminatae, 8-10(12) x 2.5-3 μ , decolorata, cum 2 guttas magnas sunt; in cormis 2 mm diam. occurrunt. β -conidia filiformia, uncinata, 25-30(33) x 1.5-2 μ sunt; in cormis 1-1.5 mm diam. occurrunt. Conidia $\alpha+\beta$ in cormis ab 3 mm diam. et magis occurrunt.

T y p u s: in Russia, regionis Crimeae, in declivibus montium, in parte superiore vallis fluminis Burulytsha locatasunt. In cormis exsiccatas *Daphne taurica* Kotov (Thymelaeaceae) occurrunt, 18.09.2013, V.P. Isikov, in Horto Botanico Nikitensis conservantur (Yalta).

In Ucraina species similis *Phomopsis delogneana* Petr. in *Daphne mezereum* L. occurrit [1]. Ab specie descriptivadis similitudinem habere cum serie characterum morphologicorum sunt.

Picnidiums are submersed, grow in groups, 200-300 mkm across diameter; visible on surface thanks to blunt cone-shaped top in thin black capsula; they are colorless inside, have one big chamber or several false chambers. Conidium-baring parts are simple, confervoid, 30-45 x 3-4 mkm. Conidia are colorless and divided into 2 types: α – oblong-oval, ends are blunt or lightly mucronate, 8-10(12) x 2,5-3 mkm, colorless with two drops, place of growth is shoots of 2mm across diameter; β – filamentous, hamiform, 25-30(33) x 1,5-2 mkm, can be found on shoots of 1-,5 mm across diameter. Conidia of $\alpha+\beta$ are found on shoots of 3 mm and more across diameter (Fig.2).

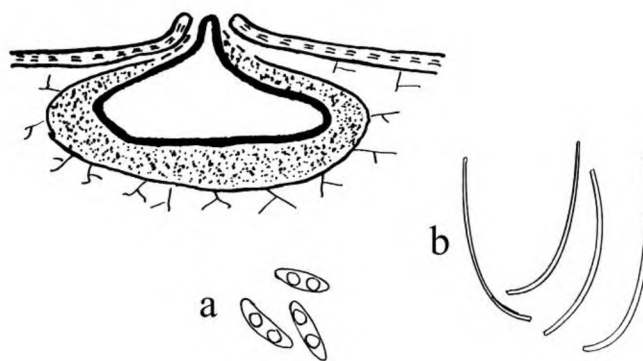


Fig.2 Across-section of fungal fruit of *Phomopsis daphnae* Isikov sp. nova and α - и β -conidiums

Type: Russia, the Crimea, mountain slopes, upper part of the river Bolshaya Burulcha. It is found on sphacelated shoots of *Daphne taurica* Kotov (Thymelaeaceae), 18.09.2013, V.P. Isikov, included into collection of Nikitsky Botanical Gardens.

In Ukraine affind species *Phomopsis delogneana* Petr. is found on *Daphne mezereum* L. (Prikarpatye). It has a number of considerable morphological characteristics which differ it from the study case.

***Cytospora taurica* Isikov sp. nova**

Pycnidia ad 4 mm in diam., solitaria, raro 3-4 occurrunt, conica, nigra, depresso-globosa, in medio papillaro-porrecta sunt. Picnidia e fissuris corticis emergentia sunt. Prominent e fissuris corticis emergentia. Stoma unum est. Endostroma olivaceum, pseudoloculosum est; parietes septifereindis tincti sunt. Conceptaculum nigrum, 50-100 μ crassitudinis, benedictinctum est. Conidiophora simplicia, decolorata, fruticulosa, 20-24(30) x 1.5-2 μ sunt. Conidia decolorata, allantoidea, 7-8(9) x 2.5-3 μ sunt.

Fungus in extremitatibus cormorum I, 1.5 mm in diam. occurrit.

T y p u s: in Russia, regionis Crimeae, in declivibus montium, in parte superiore vallis fluminis Burulytsha locatasunt. In cormis exsiccates *Daphne taurica* Kotov (Thymelaeaceae), 18.09.2013, occurrunt, 18.09.2013, V.P. Isikov, in Horto Botanico Nikitensis conservantur (Yalta).

Picnidiums till 4 mm across diameter are single, rarely make groups of 3-4 ones, cone-shaped, black, flattened - globe-shaped, inside – papillary-oblong come out of bark cracks. There is one stoma. Endostoma is olive green, falsly multi-chambered, septa are not well-marked. Conceptaculum is black, 50-100 mkm by thickness, well-marked. Conidium-bearing parts are simple, colorless, bushy, 20-24(30) x 1,5-2 mkm. Conidiums are colorless, allantoids, 7-8(9) x 2,5-3 mkm. The fungus is found on the ends of shoots of the 1st order 1,5 mm across diameter (Fig.3).

Type: Russia, the Crimea, mountain slopes, upper part of the river Bolshaya Burulcha, on sphacelated shoots of *Daphne taurica* Kotov (Thymelaeaceae), (Thymelaeaceae), 18.09.2013, V.P. Isikov, included into NBG collection.

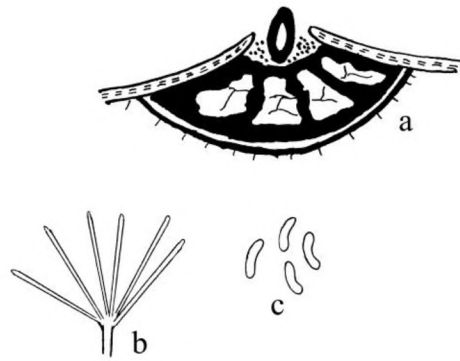


Fig.3 Across section of fungal fruit of *Cytospora taurica* Isikov sp. nova (a), conidium-bearing parts (b) and conidia (c)

***Macrophoma daphnae* Isikov sp. nova**

Pycnidia 100-200 μ in diam., substrato immersa, forma conica sunt, apex papilliformis niger in 3-4 mm in faciem prominens. In loco exitus fungi in facie cortex pallidior est. Carposomata gregaria in facie omnia substratidis posita sunt. Conidiopora parva, 5-10 μ longitudinis sunt. Conidia decolorata seu olivacea, 10-12(15) x 5-6 μ sunt. Pycnidium tunicam tenuissimam et subhyalinam habet, interdum guttae oleosae occurrunt. Fungus per plantam totam, incormis I-IV, 0.5-7 mm in diam. occurrit; fungus distributissimus in planta est.

T y p u s: in Russia, regionis Crimeae, in declivibus montium, in parte superiore vallis fluminis Burulytsha locatasunt. In cormis exsiccatis *Daphne taurica* Kotov (Thymelaeaceae) occurrunt, 18.09.2013, V.P. Isikov, in Horto Botanico Nikitensis conservantur (Yalta).

Pycnidiums are of 100-200 μ m across diameter, cone-shaped, submersed into substrate; exude with black papilliform tops 3-4 mm above the surface. On the place where fungus develops bark is lighter. Fruit bodies grow in big groups all over the substrate surface. Conidium-bearing parts are small, 5-10 μ m by length. Conidia are colorless or have olive green color, 10-12(15) x 5-6 μ m; capsular is very thin, almost transparent, sometimes oil drops. Fungus develops across the whole plant, on shoots of I-IV orders, 0.5-7 mm across diameter. It takes the first place among fungi growing on this plant (Fig. 4, 5).

Type: Russia, the Crime, mountain slopes, at the upper part of the river Bolshaya Burulcha, on sphaelated shoots of *Daphne taurica* Kotov (Thymelaeaceae), 18.09.2013, V.P. Isikov, included into NBG collection.

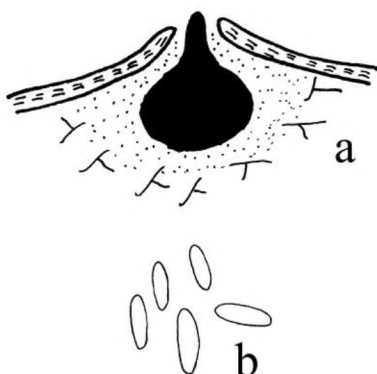


Fig.4 Across section of a fruiting body of *Macrophoma daphnae* Isikov sp. nova (a) and conidium (b) Fig.5 Fruiting bodies of *Macrophoma daphnae* Isikov sp. nova on the central shoot *Daphne taurica* Kotov

As to other fungal species registered on study plant, xylophilic fungus-polyphag ***Byssomerulius corium* (Fr.) Parm.** was found there as well. It grows on central shoots 5 mm and more across diameter. It is wide-spread in natural ecosystems and artificial stands, in the Crimea this species was revealed on 30 species of arboreal plants.

Conclusions

Therefore, on rare protected plant cultivars *Daphne taurica* 5 fungal species were found, 4 of them are new for this plant. Almost all these fungi belong to phytopathogenic species, only one of them is xylophilic. Biotrophic fungi belong to Deuteromycetes class, Sphaeropsidales order and *Phyllosticta*, *Phomopsis*, *Cytospora*, *Macrophoma* genera, while xylophilic fungus is of Basidiomycetes class, Aphyllophorales order, *Byssomerulius* genus.

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This work covers study results of mycoflora of *Daphne taurica* Kotov, rare endemic plant in the Crimea. Totally it was found out 5 fungi species of 2 classes and 5 genera. 4 new species that belong to *Phyllosticta*, *Phomopsis*, *Cytospora* and *Macrophoma* genera, class Deuteromycetes were described.

Key words: endemic; shrubs; fungi; new species; *Daphne taurica*.