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РАДА БОТАНІЧНИХ САДІВ ТА ДЕНДРОПАРКІВ УКРАЇНИ
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ІНТРОДУКЦІЯ РОСЛИН, ЗБЕРЕЖЕННЯ ТА ЗБАГАЧЕННЯ БІОРІЗНОМАНІТТЯ В БОТАНІЧНИХ САДАХ І ДЕНДРОПАРКАХ

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Висвітлюються актуальні проблеми інтродукції, збереження та збагачення біорізноманіття в ботанічних садах і дендропарках. Наведені результати досліджень з питань збереження та збагачення біорізноманіття рослин, біології та екології інтродуцентів, селекційно-генетичних та фізіолого-біохімічних аспектів інтродукції, біологічних основ використання декоративних рослин в ландшафтному будівництві, біотехнології рослин.

Для науковців, викладачів, фахівців зеленого будівництва, ботаніків, екологів, інтродукторів, аспірантів та студентів.

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PLANT REACTIONS TO CLIMATE CHANGE AS INDICATORS OF WARMING IN MARITIME ANTARCTICA

Today, biologists from around the world pay much attention to the maritime Antarctic. This region is experiencing one of the most rapid trends of regional climate warming observed across the globe [4]. The problem requires identification of reliable indicators of the influence of warming on different organisms and their communities. For the period of investigation of terrestrial ecosystems in the region, a whole set of reactions has been revealed which, with different degrees of substantiation, are thought to be connected with the climate change. In view of this, the aim of the present work was, based on original results and data from literature on the reactions of plants to warming in the region, to assess what reactions of vascular plants and bryophytes could serve as indicators of warming.

We used data collected during field studies in two regions of maritime Antarctica: the more northerly Point Thomas oasis on King George Island, the South Shetland Islands (the 30th Polish and 10th Ukrainian expeditions, 2005/06) and the more southerly Galindez Island (the 11th and 12th Ukrainian Antarctic expeditions, 2006/07). In the context of the present paper, of special interest are data we obtained on the modern distribution and secondary dispersal of *Deschampsia antarctica* Desv. and the *Colobanthus quitensis* Kunth. Bartl. in the Point Thomas oasis, as well as that on the current number of populations of both species with their sizes from Galindez Island which was compared with the results for 1990 [5], as described in Parnikoza et al. [8]. The presence of sporophytes of bryophytes was used as an additional indicator of growth conditions in both regions. The data obtained were compared with that from literature for this region [11].

A number of authors report significant increase in the numbers and growth spot size of aboriginal vascular plants, specifically in *D. antarctica* [5, 6]. Our investigation of 2006/07 hasn't revealed any overall increase in further expansion of *D. antarctica* on Galindez Island, i.e. at one of the epicenters of warming. The population has been decreasing since 1990. Further dispersal of *C. quitensis* was not observed, the size of its populations fluctuates from year to year. Such a discrepancy may have different explanations, such as incomplete initial description or the short-lived initial reactions. Indeed, in the case of Fildes Peninsula (King George Island) for which a living population of *D. antarctica* is known the initial study probably was incomplete [6]. Further studies during 2004/05 and 2005/06 just made more precise descriptions [10]. However whatever the explanation, this makes one be careful about population growth estimates, which, among other things, might also vary from year to year depending on the conditions during any particular season. Some increase of *D. antarctica* growth spot sizes along the edge of a retreating glacier demonstrated in our study may indicate the best significance of the estimate near ice regression zones.

In the case of Fildes Peninsula, *C. quitensis* represented with only one individual plant [6] didn't show any sign of further spread despite warming. At the same time, in the neighboring Point Thomas oasis, where *C. quitensis* is rather common, appearance of new colonies of this species was registered either at the ice edge of Ecology Glacier or under anthropogenic influence along the road to the Point Thomas hill.

The trend of such traits as increased biometry of generative organs, seed production, and annual biomass under warming climate conditions does not correlate with latitudinal gradient [3].

It is generally believed that bryophyte fertility decreases with increasing of latitude and therefore climatic severity. Sporophyte production in the maritime Antarctic is typically unusual, although overall 40% of species in this region have been recorded at least once with sporophytes [11]. During our study we register only single evidences of sporophyte production in the studied regions. Such a result may have been caused by that fact that our study was short term, in contrast to the abovementioned estimate based on years of observation. In general, the rates of sporophyte generation events, the percent of species that generate spores, and sporophyte characteristics behave in a way similar to that of vascular plants demonstrating no connection with geographic distribution or temperature conditions in the region [2, 3]. The frequency of sporophyte generation

in bryophytes, as well as their traits, may perhaps greatly vary depending on the conditions of particular year in the context of the microclimate of any specific habitat.

Interestingly, the impact of warming may also produce negative effects on different constituents of terrestrial vegetation as a result of the incurring water stress. Such xerophytization may negatively influence generation of sporophytes by bryophytes [7] and vascular plant rooting success [9].

Therefore, the reaction of different constituents of Antarctic terrestrial ecosystems to the progressing warming in the region is rather moderate, as vascular plants and bryophytes adapted during millions of years are exposed to nothing new but another climate fluctuation. Under the conditions where all suitable habitats have been occupied, a reaction to warming develops in a mosaic way with strong dependence on the microclimate of any specific site – from vegetation, and thus generative potential, boost in favorable microconditions to its decay as a result of xerophytization in less favorable conditions. Under climatic fluctuation between seasons, a clear-cut trend of vegetation boost may perhaps be expected only at locations where recolonization follows glacial retreat, as mentioned in Convey [4], or invades anthropogenically transformed areas. Therefore, the general influence of warming in the maritime Antarctic is largely masked by interseasonal fluctuation and microclimate heterogeneity in particular habitats, which implies that regular monitoring of the occurrence and peculiar traits of generative processes in bryophytes in different parts of the maritime Antarctic should be established.

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The general influence of warming in the maritime Antarctic is largely masked by interseasonal fluctuation and microclimate heterogeneity in particular habitats, which implies that regular monitoring of the occurrence and peculiar traits of generative processes in mosses in different parts of the maritime Antarctic should be established.

Парнікоза І. Ю., Дикий І. В., Козерецька І. А., Тищенко О. В., Кунах В. А.

РЕАКЦІЇ РОСЛИН НА КЛІМАТИЧНІ ЗМІНИ, ЯК ІНДИКАТОРИ ПОТЕПЛІННЯ В ПРИБЕРЕЖНІЙ АНТАРКТИЦІ

Загальний вплив потепління в прибережній Антарктиці сильно маскується міжсезонними коливаннями та гетерогенністю мікрокліматичних умов окремих сайтів зростання, зважаючи на що регулярний моніторинг за всіма головними параметрами різних складових наземних екосистем має бути налагоджений.