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**THE CRITERIA FOR IDENTIFYING ALIEN STATUS IN PLANTS:
A LITTLE BIT MORE ABOUT THE SAME**

Проць Б.Г. Критерії визначення адвентивного статусу у рослин: трохи більше про те саме // Наук. зап. Держ. природознавч. музею. – Львів, 2003. – 18. – С. 49-52.

Визначено критерії встановлення адвентивного статусу у рослин. Представлено термінологію, пов'язану із проблематикою. Запропоновано підхід „географічної межі” для встановлення міграційного статусу у рослин. Розглянуто можливі шляхи встановлення адвентивності у рослин, використовуючи систему критеріїв. Деякі види української флори, можливо, будуть потребувати перегляду їх статусу.

Проць Б.Г. Критерии определения адвентивного статуса у растений: немного больше о том же // Науч. зап. Гос. природоведч. музея. – Львов, 2003. – 18. – С. 49-52.

Выделены критерии определения адвентивного статуса у растений. Представлена терминология, связанная с проблематикой. Предложен подход „географической границы” для определения миграционного статуса у растений. Рассмотрены возможные пути определения адвентивности у растений с использованием системы критериев. Некоторые виды украинской флоры, возможно, будут нуждаться в пересмотре их статуса.

Stating the problem

In many local and international floras we could find an attempt to identify a migration status for the plants. Many authors have got no explanation for their decisions, which mostly have been copied uncritically from early works or have got no sufficient evidence or have been based on intuitive grounds. For example, some authors interpret the term ‘alien’ as ‘looks exotic’ and ‘native’ as ‘long-established’, ‘fits’ to the surroundings, etc. During the last century, the question of differentiation aliens and natives has risen sharply due to the growing importance of the problem of plants invasion [1-4, 7, 9]. Unfortunately, a special attention to a methodological aspect of this problem has been very poor despite it is a basic issue of invasion ecology, except the study of Webb [14]. He tried to give a systematised approach to presume the native status for British flora with no general methodological pattern. Some of his criteria, for example, historical evidence and geographical distribution, we would like to use for presuming alien status.

On one hand, it is supposed to be a simple problem; a solution lays only within definition of aliens and natives. On the other hand, practically it is not easy to make an identification of some groups of species such as archaeophytes and apophytes (synanthropic natives) or what is a geographical ‘border line’ for alien status, which is a crucial point for a methodological improvement of the problem.

In this paper we: (a) discuss a general pathways (pattern) to presume the plant alien status using the criterion approach; (b) try to determine a geographical starting point for aliens (c) make an attempt to find the difference between archaeophytes and synanthropic natives.

Terminology

More attention must be paid to a clear categorisation and standardised terminology in manuals, floras, and checklists, which include alien taxa [9, 10]. It could give an important

insight into our study as well. The terms listed follow by Schroeder [11], Kornaš [4], Sudnik-Wojcikowska & Kozniowska [12], Pyšek et al. [9], Prots [8] and Richardson et al. [10].

Alien (exotic, adventive) species is one which reached the area as a consequence of the activities of (1) Neolithic (post-Neolithic) man or of (2) his domestic animals or (3) species, which have emerged in a given area only thanks to man;

Native (indigenous) species is one which evolved in the area or which arrived there by one means or another before the beginning of the Neolithic (Mesolithic) period;

Archaeophytes – older immigrants, before A.D. 1500;

Kenophytes (neophytes) – newcomers, after A.D. 1500;

Apophytes (synanthropic natives) – a group of species, which positively react (rise in population number) to any type of a direct human activity;

Plant introduction – a plant penetration outside of its original floristic region(s), when the plant has overcome a major geographical barrier(s) through human agency.

Solving the problem

What is to be our procedure in attempting to decide on alien status? We would like to suggest three major decisive criteria and few secondary, which could only play an assistant role. The criteria we propose are as follows.

Geographical distribution. Definitely we would need relatively good information (proved by herbarium data) about the plant distribution for primary and secondary areals, their distinctiveness. They should also be located in climatically different areas. We propose to use the border of floristic region(s) of both areals as a 'geographical line' for alien status. 'Floristic region' is accepted by Meusel, Jäger & Weinert [5]. For example, *Juglans regia* L., the exotic tree, original distribution area is located within Ponticum South Siberian and Central Asian floristic regions. For the western part of the Ukrainian Carpathian Mts. and Transcarpathian Plain, which belongs to the Middle European floristic region [8], this plant is an alien. In this case the transitional area between Ponticum South Siberian and Middle European floristic regions (less than 100 km for the area) is a 'border line' for the alien status. The result of the analysis of the example flora (Fig. 1) using this approach is more detailed, sufficient and carrying additional information in comparison with the traditional use of very generalised continental, sub-continental and regional geographical units [9]. This could provide clear criteria for alien status, especially in case of neighbourhood of primary and secondary areals.

Historical evidence. Availability of precise herbarium records in historical scale plays a significant role (especially within the last 100-200 years). However, it can't give a decisive role, only together with a geographical distribution criterion. Even sometimes, the historical evidence could carry decisive information together with secondary criteria as well, like a habitat or naturalisation degree [8].

Archaeobotanical evidence. The fossil record attributable to the period between the last glaciation and the beginning of Neolithic agriculture provides the evidence of native status which can be conclusive [14]. Such status has been identified for doubtful *Chenopodium glaucum* L. or *Fallopia convolvulus* (L.) Dumort for the Middle Europe [8, 15]. Respectively, the records dated after this period could give an evidence for the alien status. It is especially important to differentiate between the groups of archaeophytes and synanthropic natives (for example, *Aristolochia clematitis* L. for the Middle Europe, which often is a subject of discussion). Also, the old manuscripts could help change a kenophyte status into

archaeophyte, as for *Castanea sativa* Miller or *Cannabis sativa* L., which have been popular with Roman settlements near the Volcanic Carpathian Mts.

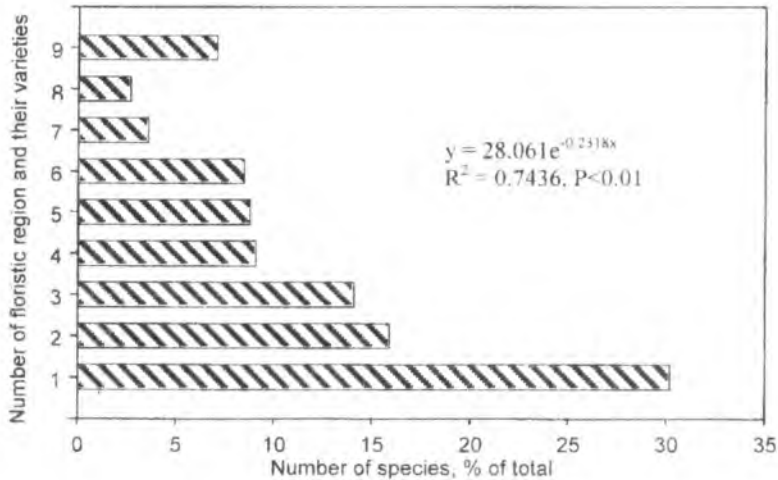


Fig. 1. Example Analysis of alien fraction of the flora of the western part of the Ukrainian Carpathian Mts. and Transcarpathian Plain; Floristic Regions and their combinations: 1 – Mediterranean; 2 – Mediterranean / Eastern Turanian; 3 – North American; 4 – Central Asian; 5 – Ponticum South Siberian; 6 – Eastern Turanian; 7 – Mediterranean/Ponticum South Siberian; 8 – South American; 9 – others (Chinese Japanese; Mediterranean/Central Asian; Indian/Mali; Himalayan / Indian; Central Asian / North American; Ponticum South Siberian/Eastern Turanian).

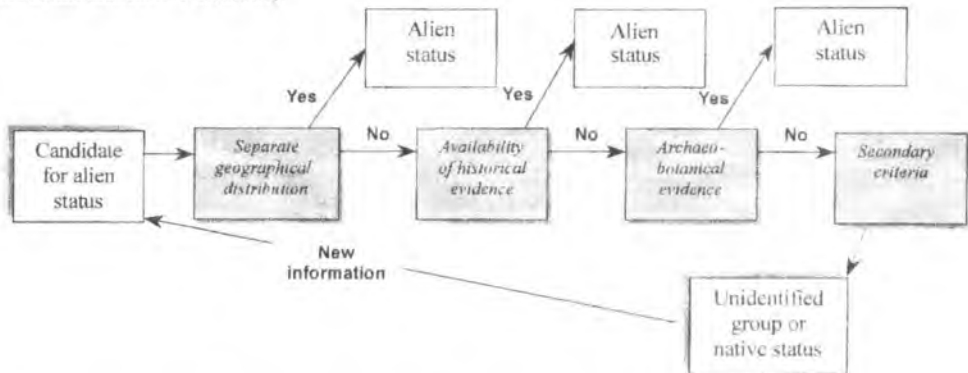


Fig. 2. The pathways to reach the plant alien status using the criterion approach.

Secondary criteria. Habitat, naturalisation degree and the way of migration could be the secondary criteria, which could help the major three criteria to make a right decision on migration status. If a plant grows only in man-made habitats, nitrogen rich, warm, dry environment, it is likely to be an alien [6,9,14], also with a ruderal life strategy, moderately naturalised and spread unintentionally by human [8].

The pathways to reach the plant alien status using the criterion approach could have a turn round way, when new information could cause even the several tries to get an appropriate presuming (Fig.2).

What kind of reconsideration could we expect?

We could expect the reconsideration of alien status for the Ukrainian Flora species. How could we identify the Ukrainian aliens? The Ukrainian territory belongs to three floristic regions (Middle European, Ponticum South Siberian and Mediterranean) and the alien fraction could have three distinctive sections. The species, which is an alien at least for one section must be on the list of the Ukrainian aliens. To have a comparable floristic data we should also standardise the list of Ukrainian archaeophytes starting from the "provisional list". This indicates the necessity of co-operation between archaeobotanists, palaeoecologist and invasion ecologists for their mutual benefit.

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