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Pre-kenophytes – species partially established in the vascular plant flora of Poland

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Among alien plant species, two groups can be distinguished: metaphytes – plants permanently established in a given region and diaphytes – plants not fully adapted to the habitat conditions in the new area. Classification of individual species into these two groups is very difficult in many cases. Naturalization is a process that usually lasts very long and to determine definitely whether a species is permanently established, long-term research related to the life cycle and habitat requirements should be carried out.

This study deals with species that cannot be precisely classified as permanently established in the flora of Poland. These species (called: pre-kenophytes) usually persist in one site for a long period (e.g. for decades) but do not tend to expand the occupied area. On the basis of our field studies and available botanical literature, the list of species which, according to authors, should be considered as pre-kenophytes is given. The list includes species brought to a given area without intentional human activity (ephemerophytes) and found

cultivated and, occasionally, escaped (ergasiophytes). These species differ in terms of establishment level. Some of them, such as *Cynodon dactylon* or *Juncus planifolius* can survive mild winter conditions and remain in one place for several growing seasons. Others (*Alyssum argenteum*, *Chenopodium pumilio*, *Tanacetum parthenifolium*) are observed in one site for several years but do not tend to spread. In the next stage of establishment are species that spread in certain regions of Poland and apart from anthropogenic sites, they occur in semi-natural habitats very often (*Campanula rapunculus*, *Cardamine chelidonia*).

Due to lack of detailed observations at the national level, it is impossible to present a comprehensive list of pre-kenophytes in Polish flora. It is difficult to predict whether all these species will start to spread, expand the secondary range or will persist at the same level of establishment. However, it is known that, in many cases, plant species that were not recorded outside cultivation in Poland a few decades ago (*Echinocystis lobata*, *Juglans regia* or *Parthenocissus inserta*) are classified as invasive at the present time.