Disseminating information on alien plants in Belgium

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Abstract. – A website that provides varied information on non-native vascular plant species in Belgium was recently launched. Its contents and some additional, more general information on alien plant species in Belgium are presented.

Introduction
Plant invasions are considered worldwide as one of the main causes of declining biodiversity (numerous references, for instance: Vitousek et al. 1996, Vitousek et al. 1997, Sala et al. 2000, van der Wal et al. 2008) and therefore received a lot of attention in the past decades. An overwhelming number of papers on the subject have been released in recent times (Brock et al. 1997, Pyšek et al. 2006, Lockwood et al. 2007). These studies predominantly emphasize on those species that are harmful in one way or another; they focus on their impact on biodiversity (for instance by outcompeting vulnerable native organisms), their economic impact (for instance as agricultural weeds) or their impact on human health (for instance by excessive pollen release causing hay fever). Much less attention is paid to the bulk of non-native plant species, namely those without a direct impact on biodiversity or whatsoever. Yet, even these species are of interest since every single attempt of migration (either induced by man or inadvertently) or escape from cultivation might represent a first step towards a future naturalization or, in the worst case scenario, invasion (Kowarik 1995, Böcker et al. 1998). Therefore, a recently launched website on alien plants in Belgium gathers information on all non-native species, regardless of their degree of naturalization: ephemeral, (locally) naturalized as well as invasive species.

Design of the website
The Natural History Museum (London) provides a handsome tool for the dissemination of information on biodiversity, Scratchpads (see: http://scratchpads.eu). It is a kind of social networking tool to build, share and publish online information on the diversity of life. This tool forms a perfect basis for the publication of an online Manual of the alien plants in Belgium (see: http://alienplantsbelgium.be). The advantages of an online publication on non-native plant species (compared with those of a hard copy) are innumerable, especially given the non-static nature of the information provided:

• The possibility of providing information that is always kept up-to-date: new species, new chorological information, additional useful characters, etc. are very easily inserted;
• A much wider, worldwide dissemination of the information is provided;
• It creates possibilities to provide a large number of various kinds of illustrations (herbarium scans, original line drawings, photos, etc.).
Content of the website

The website aims at gathering all information available on non-native vascular plants in Belgium. However, the main focus is on the (online) identification of these species. For any taxonomic entity (family, genus, species) identification keys are provided to the lower taxa. These keys evidently also include native species (one often does not know in advance whether a plant at hand is native or non-native) but any additional information is, of course, restricted to non-native species. Identification keys are original and mainly based on thorough herbarium revisions by the first author.

For every non-native species a full species account is provided with information on its history in Belgium (first record), mode of introduction, degree of naturalization, ecology (for naturalized species), additional useful information (for instance on its recognition and separation from related or similar species), references, etc.

Illustrations are provided for every accepted taxon. Original line drawings were prepared by an artist of the Botanic Garden (Sven Bellanger). If available (in most cases) photos are presented (offered by numerous amateur and professional photographers). Finally, a scan of a representative herbarium specimen is also provided (extracted from BG-Base, the online databank with scanned herbarium specimens from the National Botanic Garden). All illustrations (drawings, photos and scans) are from plants found in the wild in Belgium.

The website furthermore includes:

- A blog that mainly emphasizes on critical species: concise but fully illustrated papers on look-alikes, overlooked species, or other difficult groups, etc. (for instance a preliminary account on Cotoneaster in Belgium, a note on the identification of Yucca in Belgium, Convolvulus (Calystegia) silvaticus (vs. C. sepium), Inula racemosa (vs. I. helenium), Dianthus giganteus (vs. D. carthusianorum), Lathyrus heterophyllus (vs. L. latifolius and L. sylvestris, Rumex patientia and some of its look-alikes, an overview of interesting, unexpected records of alien plants in 2011, etc.).

- The Catalogue of neophytes in Belgium (1800-2005) (see Verloove 2006). This checklist provides an overview of all non-native vascular plant species recorded in Belgium since 1800, regardless of their degree of naturalization. For each taxon the following data are provided: current name, synonym(s), family (according to traditional, non-molecular standards), mode of introduction (accidental/deliberate), first record, most recent record, geographical origin, presence/absence in three political regions in Belgium (Flanders, Brussels, Wallonia), degree of naturalization and vector of introduction. The Catalogue furthermore provides copious information (including statistics and analysis) on such items like: taxonomic diversity, mode of introduction, geographical diversity, degree of naturalization, means of introduction, trends, outlook, etc. On the website the Catalogue is available as a pdf file. The checklist itself is kept up-to-date and new information (additional taxa, new chorological information, name changes, etc.) is quite regularly added (monthly, sometimes weekly). This version is presented as an Excel-file, which is more manageable and enables quick searching. Moreover, generic, familial and species arrangements are in accordance with recent molecular phylogenetic studies (APG III 2009).

- A list with useful publications on alien vascular plants. Any paper dealing with non-native plants published over the years in the Belgian floristic journal Dumortiera is presented as a pdf-file. In addition, other papers (mainly by the first author and/or other workers of the National Botanic Garden involved with this subject) are also available.

Some statistics and analysis

A thorough herbarium revision in the past years enabled us to compile a checklist of all non-
native vascular plants ever recorded in Belgium since ca. 1800 (Verloove 2006). On this basis it was possible to investigate various aspects of the Belgian non-native flora. Some are concisely presented beneath.

*Degree of naturalization (Fig. 1)*

It became evident that only a relatively small portion of the bulk of introduced species is able to naturalize. The number of invasive/noxious species, at least for the time being, is even very small. However, the invasion success seems to be correlated with the vector of introduction: garden escapes, for instance, proved to be much more successful than wool aliens (Verloove 2006). These figures were in accordance with most other European studies (see for instance Kowarik 1999).

![Figure 1](image1.png)

*Figure 1.* Degree of naturalization of the Belgian non-native vascular flora.

*Geographical diversity (Fig. 2)*

Europe and temperate Asia proved to be the main suppliers of non-native plant species in Belgium. The degree of American introductions was less important than expected (but is more relevant if only naturalized and invasive species are concerned). Invasion success obviously is correlated with climatological features: climatological similarities between the area of origin and the area of introduction considerably increase the possibilities for a potential naturalization or invasion. Introductions from climatologically very different areas (for instance from Africa or tropical Asia) are rarely successful.

![Figure 2](image2.png)

*Figure 2.* Geographic origin of the total Belgian non-native vascular flora, regardless of degree of naturalization. Trop.: Old and New World tropics; Hybr.: spontaneous hybrids; ?: origin unknown; AS-Tr: tropical Asia; AUS: Australasia; SAM: Southern America; NAM: Northern America; AF: Africa; AS-Te: temperate Asia; E: Europe.
**Trends (Fig. 3)**

In the past century the number of newly discovered non-native plant species in Belgium has steadily increased. Particularly since 1990 the number of new introductions has boomed. This is probably partly induced by a greater interest in non-native plant species in Belgium. However, there must have been a genuine spectacular increase in new introductions, especially of garden escapes.

**Figure 3.** Number of new plant introductions in Belgium in the past decades.

**References**


