



Appendix A

## Harmonia<sup>+PL</sup> – procedure for negative impact risk assessment for invasive alien species and potentially invasive alien species in Poland

### QUESTIONNAIRE

#### A0 | Context

Questions from this module identify the assessor and the biological, geographical & social context of the assessment.

##### a01. Name(s) of the assessor(s):

first name and family name

1. Wojciech Adamowski
2. Damian Chmura
3. Czesław Hołdyński

| acomment1. | Comments:         |  |                 |
|------------|-------------------|--|-----------------|
|            | degree            | affiliation  | assessment date |
|            | (1) dr            | Białowieża Geobotanical Station, Faculty of Biology, University of Warsaw  | 28-01-2018      |
|            | (2) dr hab.       | Institute of Environmental Protection and Engineering, University of Bielsko-Biala   | 10-04-2018      |
|            | (3) prof. dr hab. | Department of Botany and Nature Protection, Faculty of Biology and Biotechnology, University of Warmia and Mazury in Olsztyn | 18-04-2018      |

##### a02. Name(s) of *the species* under assessment:

Polish name: Niecierpek drobnokwiatowy  
Latin name: ***Impatiens parviflora* DC.**  
English name: Small balsam

acomm02.

Comments:

The name was adopted from Mirek et al. (2002 – P). This Latin name is commonly accepted (The Plant List 2013 – B). Synonyms for the Latin name: *Balsamina parviflora* (DC.) Ser. (The Plant List 2013 – B), *Impatiens nevskii* Pobed. (Matthews et al. 2015 – P).

Polish name (synonym I)

–

Polish name (synonym II)

–

Latin name (synonym I)

*Balsamina parviflora*

Latin name (synonym II)

*Impatiens nevskii*

English name (synonym I)

Small-flowered touch-me-not

English name (synonym II)

–

**a03. Area under assessment:**

**Poland**

acomm03.

Comments:

–

**a04. Status of the species in Poland. The species is:**

|                                     |
|-------------------------------------|
| <input type="checkbox"/>            |
| <input type="checkbox"/>            |
| <input type="checkbox"/>            |
| <input type="checkbox"/>            |
| <input checked="" type="checkbox"/> |

native to Poland

alien, absent from Poland

alien, present in Poland only in cultivation or captivity

alien, present in Poland in the environment, not established

alien, present in Poland in the environment, established

aconf01.

Answer provided with a

low

medium

high

**X**

level of confidence

acomm04.

Comments:

*Impatiens parviflora* was observed for the first time in the present area of Poland in 1850 and since then it has been constantly spreading. This species has the status of an invasive neophyte in Poland (Tokarska-Guzik 2005 – P). In 2012, it was included in the group of alien, established and invasive species (Tokarska-Guzik et al. 2012 – P). The species is present across the country (Zajac A. and Zajac M. 2001, Tokarska-Guzik 2005 – P), although it has the largest number of sites in its southern and western part. It has been found in over 6730 sites (Tokarska-Guzik 2005 – P). Further spread of *Impatiens parviflora* can be considered almost certain, especially in the light of subsequent reports about its presence (see Popiela et al. 2015, Zajac et al. 2015, Łapok et al. 2018 – P).

**a05. The impact of the species on major domains. The species may have an impact on:**

|                                     |
|-------------------------------------|
| <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/> |
| <input type="checkbox"/>            |
| <input type="checkbox"/>            |
| <input type="checkbox"/>            |

the environmental domain

the cultivated plants domain

the domesticated animals domain

the human domain

the other domains

acomm05.

Comments:

*Impatiens parviflora* can have a relatively strong impact on the natural environment: it often forms single-species clusters, and most seedlings appear almost simultaneously with or earlier than the seedlings of native species (Trepl 1984 – P). Due to that, *Impatiens parviflora* can monopolise access to light (Nehring et al. 2013 – P) and compete with *Impatiens noli-tangere* (Vervoort and Jacquemart 2012 – P) and even with native perennial species such as *Asarum europaeum*, *Mercurialis perennis* or *Galeobdolon luteum* (Branquart et al. 2010 – B, Glushakova et al. 2015 – P). More detailed observations of germination in this species showed that germination starting in early spring continues until August (Adamowski 2017 – A). Appearances of *Puccinia komarowii* (Bacigalová et al. 1998, Piskorz

and Klimko 2006 – P) are able to significantly reduce its size at a given site and limit its reproduction, however the intensity of the infection is quite diverse both in terms of space and time. Small balsam is a host of *Aphis fabae* aphid in Central Europe, which also attacks *Impatiens noli-tangere* in Poland (Starý et al. 2014 – P). Other sources (Aphids 2018, Tanner 2008 – B) still mention *Impatiens asiaticum*, *Impatiens balsamines* and *Impatiens impatiens* as aphids attacking both *Impatiens parviflora* and *Impatiens noli-tangere*, but there is no information as to which region of the world the observations come from. In the United Kingdom, *Xanthorhoe biriviata* was raised on *Impatiens parviflora* (Coombe 1956 – P). This geometrid feeds on *Impatiens noli-tangere* in continental Europe (Hatcher 2003 – P). *Aleurodes loniceræ*, which often feeds on *Impatiens noli-tangere*, was observed on *Impatiens parviflora* in the Bonn area (Schmitz 1991 – P). The fly *Phytoliriomyza melampyga* and the butterfly *Deilephila elpenor* (Schmitz 1991, Hatcher 2003 – P, Pitkin et al. 2018 – I) feed on the leaves of both species listed above. Further exchanges of previously monophagous herbivores between different species of *Impatiens* are possible. *Plasmopara obducens* has recently been reported on *Impatiens parviflora* in Russia (Blagoveshenskaya 2014 – I). It attacks Europe's native species *Impatiens noli-tangere* and was also considered to be the cause of death in *Impatiens walleriana* (Choi et al. 2009, Bulajic et al. 2011, Harlan et al. 2017 – P), often bred as an ornamental plant. However, a recent systematic review (Görg et al. 2017 – P) has shown that the pathogen of *Impatiens walleriana* belongs to a separate species, called *Plasmopara destructor*. It is possible that pathogens with a wider spectrum of hosts may occur in small balsam, which in the case of its spread across Poland could contribute to the spread of these pathogens. Opinions on the impact of small balsam on ecosystem integrity by disturbance of its biotic factors are divided: Branquart et al. (2010 – B) and Glushakova et al. (2015 – P) observed a decrease in the number of species on the plots occupied by small balsam, while Hejda (2012 – P) and Diekmann et al. (2015 – P) did not note such a correlation. Matthews et al. (2015 – P) mentioned the limitation of tree regeneration as one of the possible effects of *Impatiens parviflora* invasion. However, there is evidence of a strong effect of *Impatiens parviflora* on living organisms: Florianová and Munzbergová (2017 – P) showed an increase in the number of native species in the survey plots following the removal of small balsam and significant changes in the flora composition; Glushakova et al. (2015 – P) demonstrated the effect of its invasion on the composition and abundance of soil yeasts, Bobul'ská and Demková (2017 – I) – on soil enzymatic activity, and Stukalyuk (2016 – P) – on the composition of ant groups. Studies of Piskorz and Urbańska (2007 – P) showed that the snail *Columella edentula* often fed on small balsam, and often chose the lower side of its leaves as a resting place. Substances released into the soil by the roots or entering it as a result of the decomposition of the plants may inhibit the germination and growth of other plant species. Under laboratory conditions, *Impatiens parviflora* had the weakest effect of the three species of *Impatiens* species studied (Himalayan balsam *Impatiens glandulifera*, touch-me-not balsam *Impatiens noli-tangere*, small balsam *Impatiens parviflora*, Vrchatová et al. 2011 – P). However, in another study (Csiszár et al. 2012 – P) the order of influence of the *Impatiens* species studied (Kashmir balsam *Impatiens balfourii*, *Impatiens glandulifera*, *Impatiens parviflora*) depended on the concentration of the extract. Small balsam is relatively rare as a weed of cultivated fields, more often of home gardens and orchards (Dajdok and Wuczyński 2007, Adamowski et al. 2014, Woźniak and Soroka 2015 – P), nurseries and young forest plantings (Matthews et al. 2015 – P).

## A1 | Introduction

Questions from this module assess the risk for *the species* to overcome geographical barriers and – if applicable – subsequent barriers of captivity or cultivation. This leads to *introduction*, defined as the entry of *the organism* to within the limits of *the area* and subsequently into the wild.

**a06.** The probability for *the species* to expand into Poland's natural environments, as a result of self-propelled expansion after its earlier introduction outside of the Polish territory is:

|                                     |        |
|-------------------------------------|--------|
| <input type="checkbox"/>            | low    |
| <input type="checkbox"/>            | medium |
| <input checked="" type="checkbox"/> | high   |

|          |                        |     |        |                  |                     |
|----------|------------------------|-----|--------|------------------|---------------------|
| aconf02. | Answer provided with a | low | medium | high<br><b>X</b> | level of confidence |
|----------|------------------------|-----|--------|------------------|---------------------|

acomm06. Comments:  
*Impatiens parviflora* is already established in Poland, thus the probability of its appearance as a result of autonomous expansion is high, with a high degree of certainty (see *Harmonia*<sup>+PL</sup> survey manual). *Impatiens parviflora* was found for the first time on the present territory of Poland in 1850 and since then it has been constantly spreading (Zajac A. and Zajac M. 2001, Tokarska-Guzik 2005 – P). This plant is widespread in all countries bordering Poland (Cvachová and Gojdičova 1999, Parfenov 1999 – P, DAISIE 2018 – B) and can spontaneously migrate within the territory of Poland, e.g. along railways, water courses, and also by epizoochory (on fur, feathers or hooves of animals; Trepl 1984 – P).

**a07.** The probability for *the species* to be introduced into Poland’s natural environments by **unintentional human actions** is:

|                                     |        |
|-------------------------------------|--------|
| <input type="checkbox"/>            | low    |
| <input type="checkbox"/>            | medium |
| <input checked="" type="checkbox"/> | high   |

|          |                        |     |        |                  |                     |
|----------|------------------------|-----|--------|------------------|---------------------|
| aconf03. | Answer provided with a | low | medium | high<br><b>X</b> | level of confidence |
|----------|------------------------|-----|--------|------------------|---------------------|

acomm07. Comments:  
*Impatiens parviflora* is already established in Poland, so the probability of its appearance due to unintended human actions is high, with a high degree of certainty (see *Harmonia*<sup>+PL</sup> survey manual). This plant is widespread in all countries neighbouring Poland and in most of Europe (Cvachová and Gojdičova 1999, Parfenov 1999 – P, DAISIE 2018 – B) and may be unintentionally introduced in the territory of Poland, e.g. with the transport of agricultural products from areas where the species appears in fields, on vehicles, etc.

**a08.** The probability for *the species* to be introduced into Poland’s natural environments by **intentional human actions** is:

|                                     |        |
|-------------------------------------|--------|
| <input type="checkbox"/>            | low    |
| <input type="checkbox"/>            | medium |
| <input checked="" type="checkbox"/> | high   |

|          |                        |     |        |                  |                     |
|----------|------------------------|-----|--------|------------------|---------------------|
| aconf04. | Answer provided with a | low | medium | high<br><b>X</b> | level of confidence |
|----------|------------------------|-----|--------|------------------|---------------------|

acomm08. Comments:  
*Impatiens parviflora* is already established in Poland, so the probability of its appearance as a result of intended human activities is high, with a high degree of certainty (see *Harmonia*<sup>+PL</sup> survey manual). The species is rarely grown outside of botanical gardens and is not very attractive, however, its seeds can be found on sale on the Internet, and it is also promoted as a nectariferous plant for insects (Matthews et al. 2015 – P). The plant is not included in the ‘Regulation of the Minister of the Environment of 9 September 2011 on the list of plants and animals of alien species that could be a threat to native species or natural habitats in case of their release into the natural environment’ (Regulation ... 2011 – I), thus there is no legal basis for extensive control of the species or for the control of the small balsam trade.

## A2 | Establishment

Questions from this module assess the likelihood for *the species* to overcome survival and reproduction barriers. This leads to *establishment*, defined as the growth of a population to sufficient levels such that natural extinction within *the area* becomes highly unlikely.

a09. Poland provides **climate** that is:

|                                     |   |
|-------------------------------------|---|
| <input type="checkbox"/>            | non-optimal                                     |
| <input type="checkbox"/>            | sub-optimal                                     |
| <input checked="" type="checkbox"/> | optimal for establishment of <i>the species</i> |

|          |                        |     |        |          |                     |
|----------|------------------------|-----|--------|----------|---------------------|
| aconf05. | Answer provided with a | low | medium | high     | level of confidence |
|          |                        |     |        | <b>X</b> |                     |

a09. Comments:  
*Impatiens parviflora* is already established in Poland, therefore climatic conditions are optimal for its occurrence, with a high degree of certainty (see *Harmonia*<sup>+PL</sup> survey manual). Small balsam spreads both in climates much harsher than those of Poland (near Moscow, Tichomirov 1987 – P; southern Siberia, Ebel et al. 2014 – P) and in warmer climates (northern Italy, Celesti-Grapow et al. 2010 – P; Montenegro, Stešević and Drescher 2011 – P). Small balsam blooms longer in Poland – i.e. from May to October (Chmura 2014 – P) than in its homeland, where it blooms from June to August (Chen et al. 2008 – P). The compliance of the Polish climate with the climate of the homeland of small balsam ranges from 45 to 94%, and in individual positions it exceeds 94%.

a10. Poland provides **habitat** that is

|                                     |   |
|-------------------------------------|---|
| <input type="checkbox"/>            | non-optimal                                     |
| <input type="checkbox"/>            | sub-optimal                                     |
| <input checked="" type="checkbox"/> | optimal for establishment of <i>the species</i> |

|          |                        |     |        |          |                     |
|----------|------------------------|-----|--------|----------|---------------------|
| aconf06. | Answer provided with a | low | medium | high     | level of confidence |
|          |                        |     |        | <b>X</b> |                     |

a10. Comments:  
*Impatiens parviflora* is already established in Poland, thus habitat conditions are optimal for its occurrence, with a high degree of certainty (see *Harmonia*<sup>+PL</sup> survey manual). The species naturally occurs in Central Asia, where it is a component of the relict deciduous forests, forests with the dominance of walnut *Juglans regia*, wild apple *Malus* sp, and aspen *Populus tremula* var. *tardifolia*, riparian forests with the dominance of poplars *Populus* sp. and numerous species of willows *Salix* sp. and tamarisks *Tamarix* sp., and coniferous forests with the dominance of Shrenk's spruce *Picea schrenkiana* (Trepl 1984 – P). The altitude range is between 1 000 and 2 500 m above sea level (Trepl 1984 – P). In Poland, favourable habitat conditions are found across the country, although in the mountains the species has not so far been recorded above 1 150 metres above sea level (Tokarska-Guzik 2005 – P). In the Carpathian Mountains, it grows mainly in the Beskid Mountains and in the Foothills, but its spread continues (Zajęc A. and Zajęc M. 2015a – P). The most common habitat types are moderately fertile or fertile, fresh or moist, both anthropogenic (garbage dumps, roadsides, gardens, orchards and, rarely, cultivated fields) and semi-natural or natural habitats (deciduous forests: floodplain forests, oak-linden-hornbeam forests, beech forests, mixed coniferous forests, forest edge communities, Chmura 2014 – P): It has a much wider ecological amplitude, however, which also includes xerothermic grasslands and fens (Trepl 1984, Chmura 2008, 2014, Florianová and Münzbergová 2018 – P). It usually grows on mineral soils, but it also enters into other micro habitats such as plant litter, fallen logs, stumps, trunks, hollows, bark of living trees (Piskorz and Klimko 2001, Nowińska et al. 2009, Staniaszek-Kik and Żarnowiec 2013, Chmura 2014 – P, Chmura et al. 2016 – P). It prefers places with medium levels of sunlight, but it tolerates both strongly shaded and open places (railway tracks – Adamowski 1989-2003 – A), from dry to damp (Coombe 1956, Trepl 1984,

Chmura 2014 – P, CABI-2018 – B). It is often the main component of ground vegetation in secondary forest communities in the habitats of oak-linden-hornbeam forests and mixed coniferous forests and tree plantations (Adamowski et al. 2014, Chmura 2014, Matthews et al. 2015 – P).

### A3 | Spread

Questions from this module assess the risk of *the species* to overcoming dispersal barriers and (new) environmental barriers within Poland. This would lead to spread, in which vacant patches of suitable habitat become increasingly occupied from (an) already-established population(s) within Poland.

Note that spread is considered to be different from range expansions that stem from new introductions (covered by the Introduction module).

**a11.** The capacity of *the species* to disperse within Poland by natural means, **with no human assistance**, is:

- very low
- low
- medium
- high
- very high

aconf07. Answer provided with a 

|     |        |                  |
|-----|--------|------------------|
| low | medium | high<br><b>X</b> |
|-----|--------|------------------|

 level of confidence

acomment11. Comments:  
Dispersion from a single source (A type data): the seeds are ejected as a result of sudden cracking of ripe fruit (spreading by autochory) up to 3.4 m (Trepl 1984 – P). Some of the fresh seeds of small balsam float on water and can be spread by the waters of rivers and streams. However, hydrochory seems to be of limited importance for this species. Smaller mammals spread the seeds of small balsam over shorter distances, as they collect them as food. The seeds can also be spread on the fur and hooves of larger animals (Trepl 1984, Graae 2002, Matthews et al. 2015 – P, Adamowski 1989–2003 – A). Matthews et al. (2015 – P) indicated the possibility of spreading small balsam seeds by birds. The maximum rate of spread of the species in Great Britain was estimated (C type data) at 24 km/year (Perrins et al. 1993 – P). The highest and most fecund individuals produce 1 000-2 000 seeds (Trepl 1984 – P), but Coombe (1956 – P) estimated a maximum of 10 000 seeds per large plant more than 150 cm in height. In alder forests, individual plants produced an average of 90 seeds, while 10-30 seeds were produced in oak-linden-hornbeam forests (Trepl 1984 – P). Moravcová et al. (2010 – P) report an average number of seeds to be 279 per plant and 2 689 per 1 m<sup>2</sup> (in the densest populations). Considering the high production of seeds by a single plant, the dispersion routes and the rate of spread, the ability of the species to spread has been assessed as very high.

**a12.** The frequency of the dispersal of *the species* within Poland by **human actions** is:

- low
- medium
- high

aconf08. Answer provided with a 

|     |        |                  |
|-----|--------|------------------|
| low | medium | high<br><b>X</b> |
|-----|--------|------------------|

 level of confidence

acomment12. Comments:  
The deliberate spread of this species by humans cannot be excluded. The species is rarely grown outside botanical gardens and is not very attractive, however, its seeds can be found on sale on the Internet, and the plant is also promoted as a nectariferous plant for insects (Matthews et al. 2015 – P) and as a medicinal plant (Róžański 2009 – I). Public awareness of the threats posed by the cultivation or spread of invasive species, including *Impatiens*

*parviflora*, is low. The plant is not included in the 'Regulation of the Minister of the Environment of 9 September 2011 on the list of plants and animals of alien species that could be a threat to native species or natural habitats in case of their release into the natural environment' (Regulation ... 2011 – I), thus there is no legal basis for extensive control of the species or control of the small balsam trade. Unintentional transfer of seeds with transport of goods, on vehicles, on clothing and footwear and with soil during construction projects (such as road and sewage infrastructure, etc.) may also play an important role in the spread of the species (Matthews et al. 2015 – P). Further unintended introductions are very likely.

## A4a | Impact on the environmental domain

Questions from this module qualify the consequences of *the species* on wild animals and plants, habitats and ecosystems.

Impacts are linked to the conservation concern of targets. Native species that are of conservation concern refer to keystone species, protected and/or threatened species. See, for example, Red Lists, protected species lists, or Annex II of the 92/43/EEG Directive. Ecosystems that are of conservation concern refer to natural systems that are the habitat of many threatened species. These include natural forests, dry grasslands, natural rock outcrops, sand dunes, heathlands, peat bogs, marshes, rivers & ponds that have natural banks, and estuaries (Annex I of the 92/43/EEG Directive).

Native species population declines are considered at a local scale: limited decline is considered as a (mere) drop in numbers; severe decline is considered as (near) extinction. Similarly, limited ecosystem change is considered as transient and easily reversible; severe change is considered as persistent and hardly reversible.

**a13.** The effect of *the species* on native species, through **predation, parasitism or herbivory** is:

|                                     |              |
|-------------------------------------|--------------|
| <input checked="" type="checkbox"/> | inapplicable |
| <input type="checkbox"/>            | low          |
| <input type="checkbox"/>            | medium       |
| <input type="checkbox"/>            | high         |

|          |                        |     |        |      |                     |
|----------|------------------------|-----|--------|------|---------------------|
| aconf09. | Answer provided with a | low | medium | high | level of confidence |
|----------|------------------------|-----|--------|------|---------------------|

acomm13. Comments:  
*Impatiens parviflorais* is a green and autotrophic plant.

**a14.** The effect of *the species* on native species, through **competition** is:

|                                     |        |
|-------------------------------------|--------|
| <input type="checkbox"/>            | low    |
| <input checked="" type="checkbox"/> | medium |
| <input type="checkbox"/>            | high   |

|          |                        |     |        |      |                     |
|----------|------------------------|-----|--------|------|---------------------|
| aconf10. | Answer provided with a | low | medium | high | level of confidence |
|----------|------------------------|-----|--------|------|---------------------|

acomm14. Comments:  
Opinions on the impact of small balsam on native flora species are contradictory. Some researchers claim that the plant is a beneficiary of the disturbances in the forests, hence the increase in its share in the plant cover (Kujawa-Pawlaczyk 1991, Chmura 2014 – P). Others even indicate specific species that are eliminated from the forest vegetation under the influence of *Impatiens* (*Asarum europaeum*, *Mercurialis perennis* or *Galeobdolon luteum*; Trepl 1984, Piskorz and Klimko 2007, Łysik 2008 – P, Branquart et al. 2010 – B, Dobravolskaite 2012 – P) or a general reduction in the proportion of other species impacted by small balsam (Florianová and Münzbergová 2017 – P). Other studies, including a comparison of patches occupied and not occupied by small balsam, do not demonstrate any negative impact of the species on the native flora (Hejda 2012, Diekmann et al. 2016 – P). Trepl's

observations (1984 – P) showed that *I. noli-tangere* is replaced by *I. parviflora* only in suboptimal, drier habitats, while in more moist areas, *Impatiens noli-tangere* remains dominant. A comparative experiment on *I. noli-tangere* and the aliens *I. glandulifera*, *I. capensis* and *I. parviflora* proved that the latter was the second strongest competitor, especially in conditions of low soil moisture (Skalova et al. 2013 – P). The impact of *I. parviflora* on biodiversity may vary depending on the habitat conditions, the vegetation types and the history of the site (Chmura 2014 – P). The species seems to be able to fill empty niches in some forest communities, where the forest bottom was deprived of higher plants due to poor light availability before the invasion of *I. parviflora* (Eliáš 1999 – P, Tanner 2008 – B, Schmitz 1998, Kowarik 2003, Chmura 2014 – P). Supporters of the thesis of strong influence of small balsam point to the formation of monocultures by this species, as well as its early and almost simultaneous germination (Trepl 1984 – P), owing to which it is able to monopolize access to light (Kowarik 2003, Nehring et al. 2013 – P). In addition, its rapid growth and shading on other ground vegetation plants can severely limit their ability to conduct photosynthesis and thus reproduction (Matthews et al. 2015 – P). Experimental studies have shown allelopathic (toxic to other plants) effects of extracts of small balsam (Vrchotová et al. 2011, Csiszar and Bartha 2008, Csiszar et al. 2012 – P). Opponents of this thesis stress the shallowness of the root system, its recurrent deterioration after several years of domination, and the difficulty in transferring the results of experiments on allelopathy to non-laboratory conditions (Kujawa-Pawlaczyk 1991, Hejda 2012, Chmura 2014 – P). Considering the contradictory results of the competition impact studies, an average rating has been given.

a15. The effect of *the species* on native species, through **interbreeding** is:

- no / very low
- low
- medium
- high
- very high

aconf11. Answer provided with a 

|     |        |                  |
|-----|--------|------------------|
| low | medium | high<br><b>X</b> |
|-----|--------|------------------|

 level of confidence

acomment15. Comments:  
*Impatiens parviflora*, with the native *I. noli-tangere* (Janssens et al. 2006 – P), is a representative of one of 15 clades (i.e. groups of related species within the genus *Impatiens*). Despite close affinity with the native species, no hybridizing has been observed. The Botanical Society of Britain and Ireland's website provides one observation of a hybrid of *Impatiens parviflora* and *Impatiens noli-tangere* (BSBI 2018 – I, see question a21).

a16. The effect of *the species* on native species by **hosting pathogens or parasites** that are harmful to them is:

- very low
- low
- medium
- high
- very high

aconf12. Answer provided with a 

|     |                    |      |
|-----|--------------------|------|
| low | medium<br><b>X</b> | high |
|-----|--------------------|------|

 level of confidence

acomment16. Comments:  
*Impatiens parviflora* is the host of the *Aphis fabae* aphid in Central Europe, which also attacks Poland's native *Impatiens noli-tangere* (Starý et al. 2014 – P). Other sources (Tanner 2008, Aphids 2018 – B) still state *Impatiens asiaticum*, *Impatiens balsamifera* and *Impatiens parviflora* as aphids attacking both *Impatiens parviflora* and *Impatiens noli-tangere*, but there is no information on which region of the world the observations come from. In the United Kingdom, *Xanthorhoe biriviata* has been bred on *Impatiens parviflora*



(Coombe 1956 – P). This geometrid feeds on *Impatiens noli-tangere* in continental Europe (Hatcher 2003 – P). *Aleurodes loniceræ*, which often feeds on *Impatiens noli-tangere*, was observed on *Impatiens parviflora* in Germany (Schmitz 1991 – P). The fly *Phytoliriomyza melampyga* and the butterfly *Deilephila elpenor* (Schmitz 1991, Hatcher 2003 – P, Pitkin et al. 2018 – I) feed on the leaves of both these species. Many pathogenic fungi, such as *Rhizopus stolonifer*, *Rhizopus oryzae* and *Absidia glauca*, more frequently infect the native *Impatiens* species (Budziszewska 2006 – N). Further exchange of previously monophagous herbivores and pathogens between individual *Impatiens* species is possible. *Plasmopara obducens* was recently reported on *Impatiens parviflora* in Russia (Blagoveshenskaya 2014 – I). This oomycete infects Europe's native *Impatiens* species. It is possible that a wider variety of pathogens may be found on small balsam, which, if the species spreads across Poland, could contribute to the spread of these pathogens. To summarise, *I. parviflora* hosts pathogens that mainly threaten native *Impatiens noli-tangere*, which is not a species of particular concern in Poland and therefore the impact on native species is considered to be medium.

**a17.** The effect of *the species* on ecosystem integrity, by **affecting its abiotic properties** is:

|                                     |        |
|-------------------------------------|--------|
| <input checked="" type="checkbox"/> | low    |
| <input type="checkbox"/>            | medium |
| <input type="checkbox"/>            | high   |

|          |                        |     |                                     |      |                     |
|----------|------------------------|-----|-------------------------------------|------|---------------------|
| aconf13. | Answer provided with a | low | medium                              | high | level of confidence |
|          |                        |     | <input checked="" type="checkbox"/> |      |                     |

acomm17. Comments:  
The species may, under favourable conditions, form single-species aggregations particularly along forest paths. Theoretically, it is possible for it to absorb more nutrients than other native species and therefore disturb the circulation of elements (Tanner 2008 – B).

**a18.** The effect of *the species* on ecosystem integrity, by **affecting its biotic properties** is:

|                                     |        |
|-------------------------------------|--------|
| <input type="checkbox"/>            | low    |
| <input checked="" type="checkbox"/> | medium |
| <input type="checkbox"/>            | high   |

|          |                        |     |        |                                     |                     |
|----------|------------------------|-----|--------|-------------------------------------|---------------------|
| aconf14. | Answer provided with a | low | medium | high                                | level of confidence |
|          |                        |     |        | <input checked="" type="checkbox"/> |                     |

acomm18. Comments:  
Opinions on the impact of small balsam on ecosystem integrity by disturbing its biotic factors are mixed: Branquart et al. (2010 – B) and Glushakova et al. (2015 – P) observed a decrease in the number of species in the areas controlled by small balsam, while Hejda (2012 – P) and Diekmann et al. (2015 – P) did not record such a correlation. However, there is evidence of a strong effect of *Impatiens parviflora* on living organisms: Florianova and Munzbergova (2017 – P) demonstrated an increase in the number of native species on the survey plots and significant changes in the flora composition after the removal of small balsam. Glushakova et al. (2015 – P) demonstrated the effect of its invasion on the composition and diversity of soil yeasts, and Stukalyuk (2016 – P) showed the effect the plant has on the composition of ant groups. Studies of Piskorz and Urbańska (2007 – P) showed that the snail *Columella edentula* often fed on small balsam, and often chose the lower side of its leaves as a resting place. As the host of the Asian species of aphid – *Impatientinum asiaticum*, *Impatiens parviflora* indirectly enriches the fauna of aphid insects. More than 90% of the insects feeding on this species are aphids which can spread to other plants, as can pathogenic fungi. The plant is pollinated by 19 species of *Syrphidae* but there is no competition for pollinators with other plant species. A negative effect on colony formation was found in the ant *Temnothorax crassispinus*, but the effect of small balsam was no greater than that of the native *I. noli-tangere* (Mitrus et al. 2017 – P). Substances released to the soil by the roots or entering it as a result of the decomposition

of small balsam plants may inhibit the germination and growth of other plant species. Under laboratory conditions, *Impatiens parviflora* had the weakest effect of the three *Impatiens* species that were studied (*Impatiens glandulifera*, *Impatiens noli-tangere*, *Impatiens parviflora*; Vrchotová et al. 2011 – P), but in another study (Csiszár et al. 2012 – P) the order of influence of the studied *Impatiens* (*Impatiens balfourii*, *Impatiens glandulifera*, *Impatiens parviflora*) depended on the concentration of the extract. It is worth emphasizing that small balsam occurs in a wide range of soil and light conditions, as well as in a wide variety of plant communities (Chmura 2014 – P; see question 10). Based on the results of research and field observations published so far, it is difficult to unambiguously state to what extent changes in habitats occupied by small balsam are reversible.

## A4b | Impact on the cultivated plants domain

Questions from this module qualify the consequences of *the species* for cultivated plants (e.g. crops, pastures, horticultural stock).

For the questions from this module, consequence is considered ‘low’ when presence of *the species* in (or on) a population of target plants is sporadic and/or causes little damage. Harm is considered ‘medium’ when *the organism’s* development causes local yield (or plant) losses below 20%, and ‘high’ when losses range >20%.

**a19.** The effect of *the species* on cultivated plant targets through **herbivory or parasitism** is:

- inapplicable
- very low
- low
- medium
- high
- very high

aconf15.

Answer provided with a

|     |        |                  |
|-----|--------|------------------|
| low | medium | high<br><b>X</b> |
|-----|--------|------------------|

level of confidence

acomm19.

Comments:

*Impatiens parviflora* is a green and autotrophic plant.

**a20.** The effect of *the species* on cultivated plant targets through **competition** is:

- inapplicable
- very low
- low
- medium
- high
- very high

aconf16.

Answer provided with a

|     |        |                  |
|-----|--------|------------------|
| low | medium | high<br><b>X</b> |
|-----|--------|------------------|

level of confidence

acomm20.

Comments:

The species is occasionally found in cultivated fields of various cereal and root crops, but is difficult to consider it as field weed. It appears more frequently on the midfield balks and as garden weed (Dajdok and Wuczyński 2008, Adamowski et al. 2014 – P) and in nurseries and forest crops (Matthews et al. 2015 – P).

**a21.** The effect of *the species* on cultivated plant targets through **interbreeding** with related species, including the plants themselves is:

- inapplicable
- no / very low
- low

|                          |           |
|--------------------------|-----------|
| <input type="checkbox"/> | medium    |
| <input type="checkbox"/> | high      |
| <input type="checkbox"/> | very high |

|          |                        |     |        |                  |                     |
|----------|------------------------|-----|--------|------------------|---------------------|
| aconf17. | Answer provided with a | low | medium | high<br><b>X</b> | level of confidence |
|----------|------------------------|-----|--------|------------------|---------------------|

acommm21. Comments:  
No hybridization of *Impatiens parviflora* with cultivated plants in Poland have been reported. A hybrid of *Impatiens parviflora* with *I. balfourii*, which was formed by a crossbreeding with an ornamental species, also of alien origin, has been observed. So far, it has only been recorded in Switzerland (Matthews et al. 2015 – P).

**a22.** The effect of *the species* on cultivated plant targets by **affecting the cultivation system’s integrity** is:

|                                     |           |
|-------------------------------------|-----------|
| <input type="checkbox"/>            | very low  |
| <input checked="" type="checkbox"/> | low       |
| <input type="checkbox"/>            | medium    |
| <input type="checkbox"/>            | high      |
| <input type="checkbox"/>            | very high |

|          |                        |     |        |                  |                     |
|----------|------------------------|-----|--------|------------------|---------------------|
| aconf18. | Answer provided with a | low | medium | high<br><b>X</b> | level of confidence |
|----------|------------------------|-----|--------|------------------|---------------------|

acommm22. Comments:  
The literature contains very few reports of the occurrence of *Impatiens parviflora* as a weed in field crops (Dajdok and Wuczyński 2007, Adamowski et al. 2014, Woźniak and Soroka 2015 – P). It grows more frequently in home gardens and orchards (Lisek 2012, Adamowski et al. 2014 – P), nurseries and young forest plantations (Matthews et al. 2015 – P). The plant persists for several years in cuttings and newly ploughed fields and then declines (Chmura 2002 – N). However, the frequency of occurrence may increase because of further colonization of forest substitute communities on post-agricultural land, with the species spreading into adjacent fields, but this should not lead to a disturbance of crop integrity to any large extent.

**a23.** The effect of *the species* on cultivated plant targets by hosting **pathogens or parasites** that are harmful to them is:

|                                     |           |
|-------------------------------------|-----------|
| <input type="checkbox"/>            | very low  |
| <input checked="" type="checkbox"/> | low       |
| <input type="checkbox"/>            | medium    |
| <input type="checkbox"/>            | high      |
| <input type="checkbox"/>            | very high |

|          |                        |     |        |                  |                     |
|----------|------------------------|-----|--------|------------------|---------------------|
| aconf19. | Answer provided with a | low | medium | high<br><b>X</b> | level of confidence |
|----------|------------------------|-----|--------|------------------|---------------------|

acommm23. Comments:  
*Impatiens parviflora* can be a host to the aphid *Aphis fabae*, which feeds on the commonly grown ornamental plant *Impatiens walleriana* (Aphids 2018 – B). This aphid carries Cucumber mosaic virus (Nehring et al. 2013 – P). Cucumbers are not the only species that can be affected by this virus (Polák 1967, Brcak 1979 – P). *Aphis fabae* infests many plant species, including cultivated plants (sugar beets, beans, celery, Zitter and Murphy 2009 – I), so the spread of small balsam will not have a significant impact on the spread of the aphid or of Cucumber mosaic virus. *Plasmopara obducens* has recently been reported on *Impatiens parviflora* in Russia (Blagoveshenskaya 2014 – I). It attacks Europe's native *Impatiens noli-tangere* and was also considered to cause death in *Impatiens walleriana* (Choi et al. 2009, Bulajic et al. 2011, Harlan et al. 2017 – P), often bred as an ornamental plant. However, a recent systematic review (Görg et al. 2017 – P) has shown that the pathogen of *Impatiens walleriana* belongs to a separate species, called *Plasmopara destructor*.

## A4c | Impact on the domesticated animals domain

Questions from this module qualify the consequences of *the organism* on domesticated animals (e.g. production animals, companion animals). It deals with both the well-being of individual animals and the productivity of animal populations.

**a24.** The effect of *the species* on individual animal health or animal production, through **predation or parasitism** is:

- inapplicable
- very low
- low
- medium
- high
- very high

aconf20. Answer provided with a 

|     |        |      |
|-----|--------|------|
| low | medium | high |
|-----|--------|------|

 level of confidence

acomm24. Comments:  
*Impatiens parviflorais* is a green and autotrophic plant.

**a25.** The effect of *the species* on individual animal health or animal production, by having properties that are hazardous upon **contact**, is:

- very low
- low
- medium
- high
- very high

aconf21. Answer provided with a 

|     |        |                  |
|-----|--------|------------------|
| low | medium | high<br><b>X</b> |
|-----|--------|------------------|

 level of confidence

acomm25. Comments:  
There is no information in the literature indicating any risk to animal health as a result of direct contact with *Impatiens parviflora* (Matthews et al. 2015 – P). Small balsam has no toxic or allergenic properties. Herbivorous mammals such as roe deer, deer, rabbits or rodents (Coombe 1956, Schmitz 1998 – P) very rarely feed on it. The likelihood of contact between farmed animals and small balsam is low.

**a26.** The effect of *the species* on individual animal health or animal production, by hosting **pathogens or parasites** that are harmful to them, is:

- inapplicable
- very low
- low
- medium
- high
- very high

aconf22. Answer provided with a 

|     |        |      |
|-----|--------|------|
| low | medium | high |
|-----|--------|------|

 level of confidence

acomm26. Comments:  
*Impatiens parviflora* does not transmit pathogens or parasites harmful to animals (Matthews et al. 2015 – P).

## A4d | Impact on the human domain

Questions from this module qualify the consequences of *the organism* on humans. It deals with human health, being defined as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity (definition adopted from the World Health Organization).

**a27.** The effect of *the species* on human health through **parasitism** is:

|                                     |              |
|-------------------------------------|--------------|
| <input checked="" type="checkbox"/> | inapplicable |
| <input type="checkbox"/>            | very low     |
| <input type="checkbox"/>            | low          |
| <input type="checkbox"/>            | medium       |
| <input type="checkbox"/>            | high         |
| <input type="checkbox"/>            | vert high    |

|          |                        |     |        |      |                     |
|----------|------------------------|-----|--------|------|---------------------|
| aconf23. | Answer provided with a | low | medium | high | level of confidence |
|----------|------------------------|-----|--------|------|---------------------|

acomm27. Comments:  
*Impatiens parviflorais* is a green and autotrophic plant.

**a28.** The effect of *the species* on human health, by having properties that are hazardous upon **contact**, is:

|                                     |           |
|-------------------------------------|-----------|
| <input checked="" type="checkbox"/> | very low  |
| <input type="checkbox"/>            | low       |
| <input type="checkbox"/>            | medium    |
| <input type="checkbox"/>            | high      |
| <input type="checkbox"/>            | very high |

|          |                        |     |        |      |                     |
|----------|------------------------|-----|--------|------|---------------------|
| aconf24. | Answer provided with a | low | medium | high | level of confidence |
|----------|------------------------|-----|--------|------|---------------------|

acomm28. Comments:  
The species does not have a negative impact on human health (AllergenOnline 2018 – B).  
The literature provides no information on this subject (Matthews et al. 2015 – P).

**a29.** The effect of *the species* on human health, by hosting **pathogens or parasites** that are harmful to humans, is:

|                                     |              |
|-------------------------------------|--------------|
| <input checked="" type="checkbox"/> | inapplicable |
| <input type="checkbox"/>            | very low     |
| <input type="checkbox"/>            | low          |
| <input type="checkbox"/>            | medium       |
| <input type="checkbox"/>            | high         |
| <input type="checkbox"/>            | very high    |

|          |                        |     |        |      |                     |
|----------|------------------------|-----|--------|------|---------------------|
| aconf25. | Answer provided with a | low | medium | high | level of confidence |
|----------|------------------------|-----|--------|------|---------------------|

acomm29. Comments:  
The species does not transmit any pathogens or parasites to humans (Matthews et al. 2015 – P).

## A4e | Impact on other domains

Questions from this module qualify the consequences of *the species* on targets not considered in modules A4a-d.

**a30.** The effect of *the species* on causing damage to **infrastructure** is:

|                                     |          |
|-------------------------------------|----------|
| <input checked="" type="checkbox"/> | very low |
| <input type="checkbox"/>            | low      |

- medium
- high
- very high

aconf26. Answer provided with a 

|     |        |                  |
|-----|--------|------------------|
| low | medium | high<br><b>X</b> |
|-----|--------|------------------|

 level of confidence

acomm30. Comments:  
There are no reports in the literature on the impact of the species on infrastructure, e.g. in forests or in recreational areas (Matthews et al 2015 – P, Weed Risk Assessment 2013 – B).

## A5a | Impact on ecosystem services

Questions from this module qualify the consequences of *the organism* on ecosystem services. Ecosystem services are classified according to the Common International Classification of Ecosystem Services, which also includes many examples (CICES Version 4.3). Note that the answers to these questions are not used in the calculation of the overall risk score (which deals with ecosystems in a different way), but can be considered when decisions are made about management of *the species*.

**a31.** The effect of *the species* on **provisioning services** is:

- significantly negative
- moderately negative
- neutral
- moderately positive
- significantly positive

aconf27. Answer provided with a 

|     |                    |      |
|-----|--------------------|------|
| low | medium<br><b>X</b> | high |
|-----|--------------------|------|

 level of confidence

acomm31. Comments:  
Small balsam can have a negative impact on tree regeneration (Tanner 2008 – B) and growth of young trees in nurseries and plantations (Matthews et al. 2015 – P) by competing with seedlings and juveniles, but there is a lack of convincing research in this area. This species is sometimes a host to Cucumber mosaic virus and *Aphis fabae* aphid, a parasite of many crop species. Some reports indicate that *I. parviflora* may be an edible plant. Leaves of small balsam contain a lot of vitamin C, and when consumed raw they can be the source of this substance (Griebel 1948 – P), but raw sprouts can cause nausea. In addition, they contain a lot of oxalates, which is why they are not recommended for people susceptible to kidney stone formation or arthritis. The seeds have a pleasant nutty taste and can even be eaten raw (Łuczaj 2002 – P). Düll and Kutzelnigg (1988 – P) reported that dried plant stems were a source of food for people during starvation periods. Like many other plants, small balsam can be used as a medical plant. Water-alcoholic fruit extracts and herbal extracts are used. As a potential healing plant, it has a wide range of uses. *Impatiens parviflora* leaf extracts can be used as anti-inflammatory, diuretic and anti-cramp agents. They inhibit autoimmune reactions and may be a medicine against lupus, and atopic dermatitis, it is also used in anti-acne, anti-androgenic, hypoglycaemic and anti-atherosclerotic treatment. It also has an antibacterial, antifungal and antiallergic effect. The plant extract also has a mild laxative and protective effect on the liver, kidneys and heart. Preparations made from *Impatiens* also prevent prostate hypertrophy and help in the treatment of kidneys and urinary tract (Róžański 2009 – I).

**a32.** The effect of *the species* on **regulation and maintenance services** is:

- significantly negative
- moderately negative
- neutral

- moderately positive
- significantly positive

aconf28. Answer provided with a 

|     |                    |      |
|-----|--------------------|------|
| low | medium<br><b>X</b> | high |
|-----|--------------------|------|

 level of confidence

acommm32. Comments:  
There are no direct data available in this respect. It is believed that the presence of small balsam can affect the physical, chemical and biological properties of the soil (see question a17). *Impatiens parviflora* may have a negative impact on the stability of ecosystems (see questions a14 and a16). However, there is a lack of convincing scientific data on this subject.

**a33.** The effect of *the species* on **cultural services** is:

- significantly negative
- moderately negative
- neutral
- moderately positive
- significantly positive

aconf29. Answer provided with a 

|     |                    |      |
|-----|--------------------|------|
| low | medium<br><b>X</b> | high |
|-----|--------------------|------|

 level of confidence

acommm33. Comments:  
This species enters protected areas, such as national parks and nature reserves (Olaczek 1998, Bomanowska et al. 2014 – P). For ecologically conscious tourists and nature lovers familiar with the problem of biological invasions, the presence of invasive species of alien origin may reduce their estimation of the natural value of the places and recreational areas visited.

## A5b | Effect of climate change on the risk assessment of the negative impact of the species

Below, each of the Harmonia<sup>+PL</sup> modules is revisited under the premise of the future climate. The proposed time horizon is the mid-21st century. We suggest taking into account the reports of the Intergovernmental Panel on Climate Change. Specifically, the expected changes in atmospheric variables listed in its 2013 report on the physical science basis may be used for this purpose. The global temperature is expected to rise by 1 to 2°C by 2046-2065.

Note that the answers to these questions are not used in the calculation of the overall risk score, but can be but can be considered when decisions are made about management of *the species*.

**a34.** INTRODUCTION – Due to climate change, the probability for *the species* to overcome geographical barriers and – if applicable – subsequent barriers of captivity or cultivation in Poland will:

- decrease significantly
- decrease moderately
- not change
- increase moderately
- increase significantly

aconf30. Answer provided with a 

|     |        |                  |
|-----|--------|------------------|
| low | medium | high<br><b>X</b> |
|-----|--------|------------------|

 level of confidence

acommm34. Comments:  
The species is so common in Poland that global warming will not affect this process.

**a35. ESTABLISHMENT** – Due to climate change, the probability for *the species* to overcome barriers that have prevented its survival and reproduction in Poland will:

- decrease significantly
- decrease moderately
- not change
- increase moderately
- increase significantly

aconf31. Answer provided with a 

|     |        |                  |
|-----|--------|------------------|
| low | medium | high<br><b>X</b> |
|-----|--------|------------------|

 level of confidence

acomm35. Comments:  
Forecasted changes of climate (Anders et al. 2014 – P) and of hydrological regime (Stagl et al. 2014 – P) for Central Europe are so complicated that no clear conclusions can be drawn about their impact on the level of invasiveness of *Impatiens parviflora*. The species has already overcome barriers relating to establishment and reproduction. *Impatiens* seeds require stratification (Coombe 1956 – P) so a low temperature in winter is needed. According to Jouret (1974 – P), temperatures between 0 and 5°C are ideal for stratification. Climate warming will not increase the efficiency of reproduction significantly.

**a36. SPREAD** – Due to climate change, the probability for *the species* to overcome barriers that have prevented its spread in Poland will:

- decrease significantly
- decrease moderately
- not change
- increase moderately
- increase significantly

aconf32. Answer provided with a 

|     |        |                  |
|-----|--------|------------------|
| low | medium | high<br><b>X</b> |
|-----|--------|------------------|

 level of confidence

acomm36. Comments:  
Climate warming should not change the rate of spread of the species (Matthews et al 2015 – P). However, it may be assumed that the limit of the altitude range of this species will be raised in mountain areas (Laube et al. 2015 – P).

**a37. IMPACT ON THE ENVIRONMENTAL DOMAIN** – Due to climate change, the consequences of *the species* on wild animals and plants, habitats and ecosystems in Poland will:

- decrease significantly
- decrease moderately
- not change
- increase moderately
- increase significantly

aconf33. Answer provided with a 

|     |                    |      |
|-----|--------------------|------|
| low | medium<br><b>X</b> | high |
|-----|--------------------|------|

 level of confidence

acomm37. Comments:  
Climate warming is not expected to change the impact of the species on the natural environment (Matthews et al 2015 – P).

**a38. IMPACT ON THE CULTIVATED PLANTS DOMAIN** – Due to climate change, the consequences of *the species* on cultivated plants and plant domain in Poland will:

- decrease significantly
- decrease moderately
- not change



- increase moderately
- increase significantly

aconf34. Answer provided with a 

|     |                    |      |
|-----|--------------------|------|
| low | medium<br><b>X</b> | high |
|-----|--------------------|------|

 level of confidence

acommm38. Comments:  
Climate warming should not change the impact of the species on crops and crop production (Matthews et al. 2015 – P).

**a39. IMPACT ON THE DOMESTICATED ANIMALS DOMAIN** – Due to climate change, the consequences of *the species* on domesticated animals and animal production in Poland will:

- decrease significantly
- decrease moderately
- not change
- increase moderately
- increase significantly

aconf35. Answer provided with a 

|     |        |                  |
|-----|--------|------------------|
| low | medium | high<br><b>X</b> |
|-----|--------|------------------|

 level of confidence

acommm39. Comments:  
*Impatiens parviflora* has no visible impact on domestic animals, and projected climate change will not change it (Matthews et al. 2015 – P).

**a40. IMPACT ON THE HUMAN DOMAIN** – Due to climate change, the consequences of *the species* on human in Poland will:

- decrease significantly
- decrease moderately
- not change
- increase moderately
- increase significantly

aconf36. Answer provided with a 

|     |        |                  |
|-----|--------|------------------|
| low | medium | high<br><b>X</b> |
|-----|--------|------------------|

 level of confidence

acommm40. Comments:  
*Impatiens parviflora* does not affect humans and climate warming will not change the behaviour of the species in this matter (Matthews et al. 2015 – P).

**a41. IMPACT ON OTHER DOMAINS** – Due to climate change, the consequences of *the species* on other domains in Poland will:

- decrease significantly
- decrease moderately
- not change
- increase moderately
- increase significantly

aconf37. Answer provided with a 

|     |        |                  |
|-----|--------|------------------|
| low | medium | high<br><b>X</b> |
|-----|--------|------------------|

 level of confidence

acommm41. Comments:  
*Impatiens parviflora* has no visible impact on other facilities and the projected climate change will not change it (Matthews et al. 2015 – P).

## Summary

| Module   | Score                              | Confidence |
|--|------------------------------------|------------|
| Introduction (questions: a06-a08)                | 1.00                               | 1.00       |
| Establishment (questions: a09-a10)               | 1.00                               | 1.00       |
| Spread (questions: a11-a12)                      | 1.00                               | 1.00       |
| Environmental impact (questions: a13-a18)        | 0.35                               | 0.70       |
| Cultivated plants impact (questions: a19-a23)    | 0.15                               | 1.00       |
| Domesticated animals impact (questions: a24-a26) | 0.00                               | 1.00       |
| Human impact (questions: a27-a29)                | 0.00                               | 1.00       |
| Other impact (questions: a30)                    | 0.00                               | 1.00       |
| Invasion (questions: a06-a12)                    | 1.00                               | 1.00       |
| Impact (questions: a13-a30)                      | 0.35                               | 0.94       |
| Overall risk score                               | 0.35                               |            |
| Category of invasiveness                         | potentially invasive alien species |            |

## A6 | Comments

This assessment is based on information available at the time of its completion. It has to be taken into account, however, that biological invasions are, by definition, very dynamic and unpredictable. This unpredictability includes assessing the consequences of introductions of new alien species and detecting their negative impact. As a result, the assessment of the species may change in time. For this reason it is recommended that it regularly repeated.

acomm42.

Comments:

–

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