

Citizen science application: Invasive Alien Species Europe

Original

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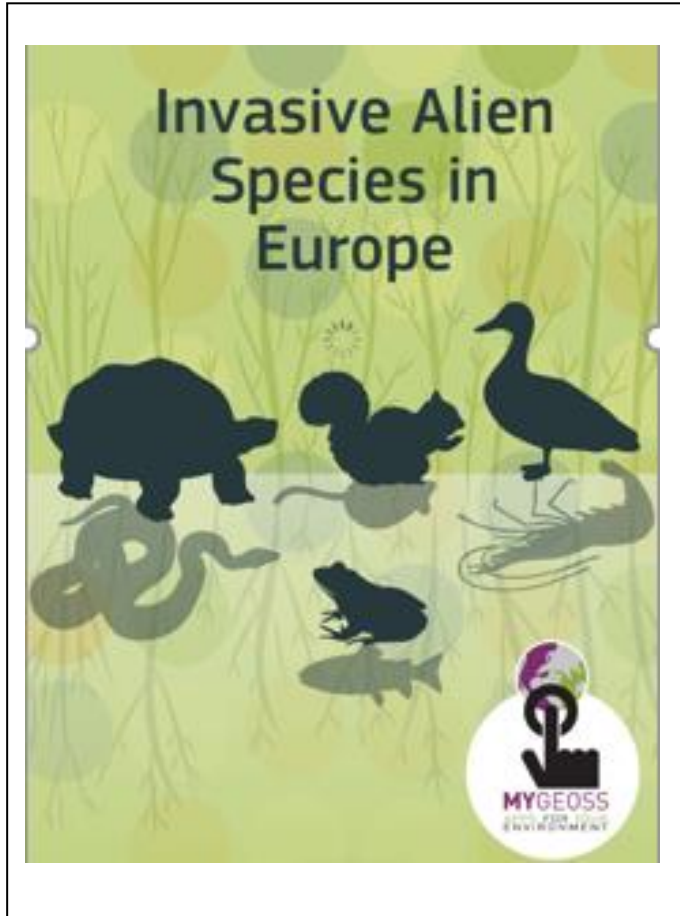
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JRC TECHNICAL REPORTS

Citizen science application

Invasive Alien Species in Europe



Tsiamis Konstantinos, Gervasini Eugenio, D'Amico Fabio, Deriu Ivan, Elena Roglia, Sven Shade, Massimo Craglia, Cardoso Ana Cristina

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All images are depicted with their original source cited; contributors are mentioned also in the Acknowledgements.

The EU Invasive Alien Species Smartphone App

Abstract

The JRC, within the framework of MYGEOSS initiative devoted to citizen science, has developed an application for Apple and Android smartphone devices called "Invasive Alien Species Europe", which allows users to report the presence of the 37 species currently listed as Invasive Alien Species (IAS) of Union concern (EU Regulation 1143/2014) on the European territory. User friendly factsheets and pictures guide the user towards the species likely to have been observed. Once validated, data will be fed into the European Alien Species Information Network (EASIN). The App is expected to stimulate citizens' awareness to the IAS issues and to involve them in IAS monitoring and reporting. In addition, the information generated through the App could supplement Member States Competent Authorities surveillance systems. The App can be freely downloaded from Google Play and Apple Store.

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Abstract

Tackling alien species (AS) demands international collaboration, harmonization and sharing of data. The European Alien Species Information Network (EASIN) is committed to this aim, as the official information system assisting the European Commission and the European Union (EU) Member States with the implementation of the EU Regulation 1143/2014 on Invasive Alien Species (IAS). Citizens can provide a substantial contribution by reporting the sighting of IAS identified as of Union concern, according to the EU Regulation, supplementing Member States Competent Authorities surveillance systems. The JRC, within the framework of the MYGEOSS project, which received funding from the Horizon 2020 programme, has developed an application for Apple and Android devices called "Invasive Alien Species Europe", allowing users to report the presence of the 37 species currently listed as of IAS of Union concern on the European territory. User friendly factsheets and pictures guide the user towards the species likely to have been observed. Once validated, data will be fed into the EASIN system. The App can be freely downloaded from Google Play and the Apple Store.

1 Introduction

Since the 1950s Alien Species (AS) have increased worldwide, and are currently present in almost every ecosystem type (Vitousek et al., 1997, Hulme, 2009, Keller et al., 2011, Roques et al., 2016). In some cases, AS have become invasive, threatening native biota. They belong to all major taxonomic groups, including viruses, fungi, algae, mosses, ferns, higher plants, invertebrates, fish, amphibians, reptiles, birds and mammals. AS impact can be multiple: a) on human health, such as the spread of diseases and allergens (Juliano and Lounibos, 2005, Mazza et al., 2014); b) on the economy, such as damage to agriculture and infrastructures (Bax et al., 2003, Vilà et al., 2010); c) on the environment, such as the irretrievable loss of native species, damaging of ecosystems and causing biodiversity decline (Vilà et al., 2011, Katsanevakis et al. 2014). Invasive alien species (IAS) can transform the structure and species composition of ecosystems by repressing or excluding native species, either directly by predation or competition for resources, or indirectly by modifying habitats, modifying nutrients cycles, and through the transmission of diseases (Rushton et al. 2006, Tylianakis et al., 2008, Simberloff et al., 2013).

It is estimated that 10-15 % of the AS identified in the European environment cause environmental, economic and/or social damage. Recognising the increasingly serious problem of IAS in Europe the European Commission published a dedicated Regulation on IAS (EU Regulation no. 1143/2014, hereafter referred to as the IAS Regulation; EU, 2014). The implementation of this Regulation is supported by the European Alien Species Information Network (EASIN; <http://easin.jrc.ec.europa.eu/about>), an information system developed by the DG Joint Research Centre (JRC) of the European Commission. The IAS Regulation gives priority at European level to a subset of IAS, named as "invasive alien species of Union concern" (Art. 4 "the Union list", hereinafter IAS of Union concern). As a general principle species included in the list can cause such a significant damage in Member States (MS) justifying the adoption of dedicated control measures. The list contains 37 taxa, including both animals and plants (EU, 2016). MS must prioritize pathways for IAS prevention, enforce effective surveillance to ensure early detection and rapid eradication measures for new introductions, apply eradication measures to species which are at an early stage of invasion, and apply management measures to those already widely spread.

The timely access to spatial data on IAS of Union concern is a key aspect for their successful management. EASIN integrates spatial data from distributed data sources, including MS competent authorities, and provides maps of species' occurrences. Species spatial data information needs to be of high quality and provide a complete and updated picture of species occurrences.

Many IAS of Union concern are large and easily recognizable species (e.g. *Muntingia calabura*, *Myocastor coypus*), found in terrestrial and freshwater habitats surrounding urban areas (e.g. *Corvus splendens*, only found close to human settlements). As a result, the general public, citizen-scientists in particular, could be easily involved in the reporting and monitoring of IAS of Union concern, which could make the difference in the early detections and rapid response actions.

The JRC, within the framework of MYGEOSS project devoted to citizen science (smart Internet applications informing European citizens on the changes affecting their local environment), has developed a smartphone application (App) for Apple and Android devices called "**Invasive Alien Species Europe**", allowing users to report the presence of the 37 IAS of Union concern on the European territory. User friendly factsheets and pictures have been prepared and included in the App to guide the user towards the species likely to have been observed. Once validated, data will be fed into EASIN information system. The App, which is open source, can be freely downloaded from Google Play and Apple Store. MYGEOSS has received funding from the Horizon 2020 programme.

The smartphone App aims to:

- stimulate citizen awareness and involvement in environmental monitoring and reporting of IAS,
- complement existing official surveillance systems on IAS of Union Concern in Member States.

2 Mobile application

The App, which can be downloaded at <http://easin.jrc.ec.europa.eu> and http://digitalearthlab.jrc.ec.europa.eu/mygeoss/apps_jrc.cfm, is intended to be used on smartphones running on Apple iOS or Android (Figure 1). It is capable of receiving/sending data by using the RESTful web service technology.

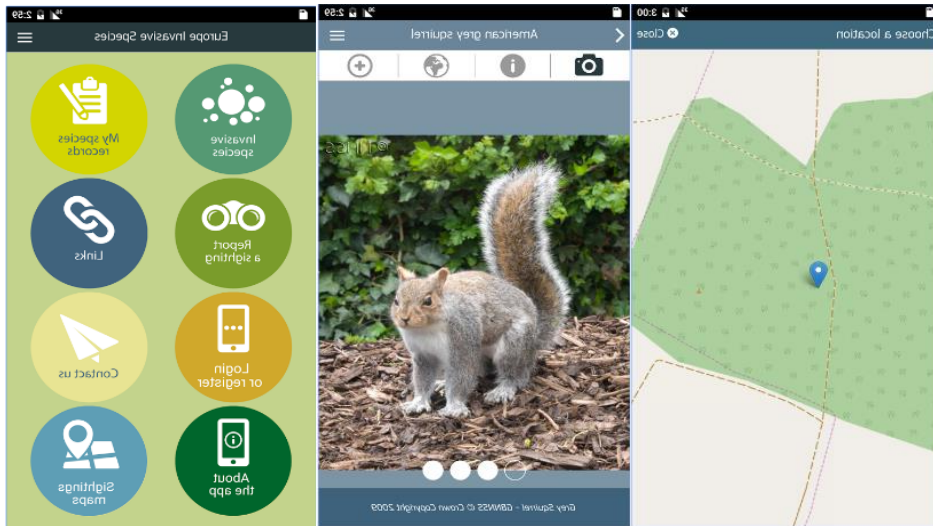


Figure 1. Screenshots of the **Invasive Alien Species Europe** App, including the starting page (left).

2.1 Current features

After being installed, the App has access to the mobile device camera, GPS sensor, pictures, and eventually other device capabilities and services, through which the species data are acquired. The user can register and log-in, and keep authentication data saved on the device.

One or more geo-referenced picture of the observed species, user data and other fields such as environment description and number of specimens, can be submitted. The species can be chosen from a list supplemented by user-friendly factsheets. The data can be saved and submitted as soon as the user is ready and the device is on-line.

The submitted species observations (SOBs) are currently checked through a simple user interface for administrators (see Roglia et al, 2016). These once logged-in can change the status of the SOBs after verifying if these are real, not offensive and relevant to the purpose of the App.

Every accepted SOB is displayed on a map representing Europe (Figure 2). By zooming in the map it is possible to see the locations from which the SOBs have been reported (the coordinates are given by the pictures). By clicking the SOB on the map, it is possible to open a small pop-up or balloon showing the SOB's summary.

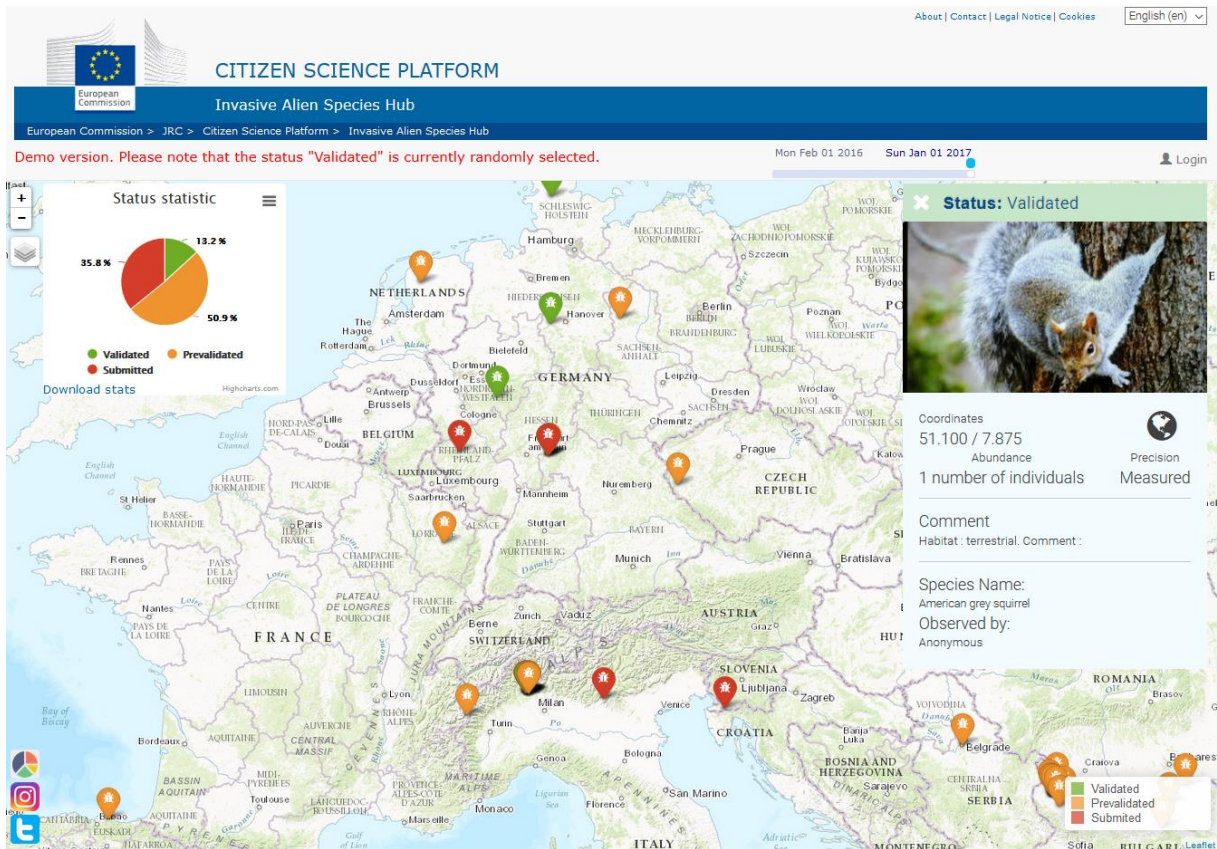


Figure 2. The European map with all SOBs (<http://digitalearthlab.jrc.ec.europa.eu/hub/ias/>).

2.2 Future features

The number of species to be reported via the App might increase as soon as the Union List will be updated. Currently 37 species can be reported.

A scientific valid and effective validation process should be put in place through which citizens' observations are pre-checked to ensure that pictures are pertinent, i.e. to eliminate pictures not relevant, and then validated. To this aim, the observations could be processed in discussions taking place in a forum-like platform. The outcome of a discussion would be the final approval of a SOB or its rejection. Any SOB state change must result in a notification sent to the original reporter.

At present the service/database receiving the SOBs is not connected to EASIN, while the authentication is done via an EASIN RESTful web service. In order to get the SOBs incorporated in EASIN, some system integration will be needed. Options include:

- To make the SOB-receiving service part of EASIN, developing the validation back-end as part of EASIN, and modifying the App to send SOBs to the new URLs.
- To connect the App and EASIN Geodatabase via web services so that SOBs managed in MyGEOSS database can be imported in EASIN. In this case the above validation back-end should be part of the web application showing the SOBs in a map.

3 App content

The App contains all the 37 IAS of Union concern. The summary factsheets of all 37 species can be found in Annex I. Each factsheet includes the essential information to guide the App user towards the correct identification of an observed species. The following information is included for each species: species appearance, confounding traits with similar species, living environment, behaviour, invasion history, origin, and links to access additional information.

The list of IAS of Union concern includes about half terrestrial and half freshwater species, of which 23 animal species and 14 plant species. Animal species correspond mostly to vertebrates, mainly mammals. There are also several invertebrate species, all belonging to *Malacostraca* (crayfish), with the exception of one insect. All plants belong to the Division *Tracheophyta*.

Most of the IAS of Union concern originate from America (mainly North America); the second most important area of origin is Asia, and East Asia in particular. For what concerns introduction pathway in Europe, most IAS of Union concern have been introduced into Europe through the main pathway "Escape from confinement". This pathway is mostly related with the sub-category pathways "Pet/aquarium/terrarium species (including live food for such species)", "Botanical garden/zoo/aquaria (excluding domestic aquaria)" and escapes linked with "Ornamental purpose other than horticulture".

4 Conclusions

The App is aimed at stimulating citizens' awareness towards the IAS issues and to involve them in IAS monitoring and reporting. The expected result are spatial data complementing existing surveillance systems on IAS of Union concern in the MS and data aggregated from EASIN partners' network.

The App is published in Google Play and the Apple Store and it can be downloaded by all interested users. A simple RESTful API to retrieve and access data submitted and collected by the App is available, and future improvements are planned, e.g. allowing filtering by country. A website for submitted data visualization is also available. Integration of data with EASIN is pending and will require the establishment of a validation procedure.

The App software has also been recently released under EUPL (European Public Licence) and is open for re-use. Dialogue has been started with EU MS Competent Authorities about data and software re-use at national level in the context of their obligation for the implementation of the IAS Regulation. Translation of the App content is also under consideration.

The App is currently tested within the Danube Region (between October 2016 and April 2017) in the frame of the Danube Reference Data and Service Infrastructure (DRDSI), work package n. 894, with the aim of checking the App functionalities and collecting SOBs for the establishment of a suitable validation system.

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6. List of Figures

Figure 1. Screenshots of the Invasive Alien Species Europe App, including the homepage interface (left).

Figure 2. The European map with all SOBs (<http://digitalearthlab.jrc.ec.europa.eu/hub/ias/>).

7. List of Annexes

Annex 1. IAS of Union concern factsheets

Eastern Baccharis

Baccharis halimifolia (Plantae: Tracheophyta)

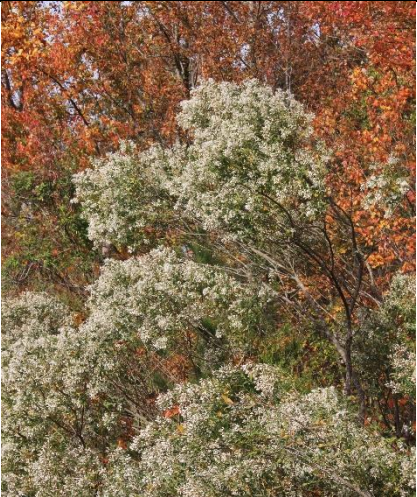
1. Photos



Baccharis halimifolia - © Jane Shelby Richardson (Creative Commons Attribution 3.0 Unported)



Baccharis halimifolia © James H. Miller & Ted Bodner (Creative Commons Attribution 3.0 Unported) II



Baccharis halimifolia © Jane Shelby Richardson (Creative Commons Attribution 3.0 Unported)

Baccharis halimifolia © James H. Miller & Ted Bodner (Creative Commons Attribution 3.0 Unported)



Baccharis halimifolia © Steve Hurst (Public Domain)

2. What does it look like?

- a large fall-flowering shrub, reaching 5 m high
- densely branched
- leaves deciduous, simple, oval to elliptic, alternately located, usually with marginal teeth
- flowers whitish, narrowly tubular, borne in numerous small crowded apical clusters
- fruit one-seeded, cylindrical, subtended by white hairs called "pappus"

3. Confusion with similar species

- sometimes confused with the bigleaf marsh-elder (*Iva frutescens*)
- can be distinguished by its alternate leaves (contrary to the bigleaf marsh-elder)

4. Where does it live?

- wetlands and estuaries
- ditches and roadsides

5. Behaviour

- a fast-growing plant
- tolerate to shade and resistant to salt spray
- flowering usually in early autumn
- seed production very prolific with thousands seeds produced
- seeds easily dispersed by wind and water

6. Invasion history

- native to North America
- introduced into Western Europe as ornamental plant
- can rapidly colonize new areas and outcompete native saltmarsh species for water and nutrients
- seeds are toxic to livestock and humans
- air-borne pollen is thought to be a potential allergen

7. Further information

- <http://www.cabi.org/isc/datasheet/8164>
- https://en.wikipedia.org/wiki/Baccharis_halimifolia
- http://www.eppo.int/QUARANTINE/Pest_Risk_Analysis/PRAdocs_plants/13-18359_PRA_record_Baccharis_halimifolia.pdf

8. Distribution in your current place

- map with APP distribution records near the user's area

9. Report new record

- appropriate link

Pallas's Squirrel

Callosciurus erythraeus (Animalia: Mammalia)

1. Photos



Callosciurus erythraeus - © David Blank
(Creative Commons Attribution-Noncommercial-Share Alike 3.0 Unported License)

2. What does it look like?

- a medium-sized tree squirrel, up to 50 cm long (including the tail)
- usually brownish on the upper body, reddish on the belly, often some black on the tail
- coloration can vary depending on geography

3. Confusion with similar species

- distinction from other squirrels can be difficult
- can be distinguished by the absence of black and buff stripes along the flanks

4. Where does it live?

- broadleaved and conifer forests
- city parks

5. Behaviour

- herbivorous species, consumes leaves, flowers, fruits, seeds
- commonly found in tree hollows
- constructs leaf nests above the ground
- young individuals disperse from their natal areas and establish their own home ranges

6. Invasion history

- native to Southeast Asia
- introduced as a pet
- can cause severe debarking of trees
- can outcompete native squirrels for food and nest sites

7. Further information

- <http://www.cabi.org/isc/datasheet/91200>
- https://en.wikipedia.org/wiki/Pallas%27s_squirrel

8. Distribution in your current place

- map with APP distribution records near the user's area

9. Report new record

- appropriate link

Kudzu vine

Pueraria montana var. *lobata*

= *Pueraria lobata* (Plantae: Tracheophyta)

1. Photos



Pueraria lobata - ©Σ64 (Creative Commons Attribution 3.0 Unported)



Pueraria lobata © Bastique (Creative Commons Attribution 3.0 Unported)



Pueraria lobata © Doctoroftcm (Creative Commons Attribution-Share Alike 3.0 Unported)



Pueraria lobata © Forest & Kim Starr (Creative Commons Attribution 3.0 Unported)

2. What does it look like?

- stoloniferous and climbing perennial semi-woody vine
- its large and dense roots can comprise about the half of the plant's biomass
- stems reach up to 30 m long
- leaves alternate with three leaflets, pale green to greyish, usually slightly lobed
- flowers purple to reddish, pea-like, commonly occurring in pairs
- seed pods brown, up to 7 cm long, rather flat, hairy, and bearing 3-10 seeds

3. Confusion with similar species

- None

4. Where does it live?

- terrestrial: forests, agricultural areas, grasslands, riparian zones
- urban areas (roads, telephone poles, abandoned buildings)

5. Behaviour

- growth can be very rapid
- can attach and climb most surfaces
- seeds are dispersed by wind, animals, water
- its large roots act as water reservoirs, permitting the plant to withstand drought
- symbiotic relationship with nitrogen-fixing bacteria

6. Invasion history

- native to Southeast Asia
- introduced through intentional (mainly horticulture) and accidental releases
- kills mostly all plants that it overgrows
- a significant pest, reduces native species biodiversity and completely modifies the ecosystem
- can cover and smother orchard and plantation crops causing economic damages

7. Further information

- <http://www.issg.org/database/species/ecology.asp?si=81&fr=1&sts=&lang=EN>
- <http://www.cabi.org/isc/datasheet/45903>
- https://en.wikipedia.org/wiki/Pueraria_montana

8. Distribution in your current place

- map with APP distribution records near the user's area




9. Report new record

- appropriate link

Persian hogweed

Heracleum persicum (Plantae: Tracheophyta)

1. Photos

 <p><i>Heracleum persicum</i> © Krister Brandser (public domain) (1)</p>	 <p><i>Heracleum persicum</i> © Krister Brandser (public domain) (2)</p>
 <p><i>Heracleum persicum</i> © Krister Brandser (public domain) (3)</p>	

2. What does it look like?

- herb, up to 1.5 m high
- many stems, bristly haired, red-brown in their base
- leaves alternate, stalked, pinnate in 5 segments, with lower side haired, glabrous on top
- leaflets lobed, with blunt-toothed margins
- flowers white, forming a compound umbel
- small seeds, obovate, 8 mm long

3. Confusion with similar species

- easily confused with other *Heracleum* species (such as *H. mantegazzianum*)
- can be distinguished by the color of the stems' base and the shape of the leaflets' lobes

4. Where does it live?

- terrestrial, common in gardens, parks and near urban areas

5. Behaviour

- perennial species
- prefers moist and nutritious soils
- flowers during summer

6. Invasion history

- native to Middle East, probably Iran
- introduced as an ornamental plant
- can outcompete native plants and become a plague
- its bristles can cause eczema after physical contact; after exposure sunlight should be avoided
- the seeds are used in Persian cooking

7. Further information

- <http://www.luontoportti.com/suomi/en/kukkakasvit/persian-hogweed>
- https://en.wikipedia.org/wiki/Heracleum_persicum

8. Distribution in your current place

- map with APP distribution records near the user's area

9. Report new record

- appropriate link

Sosnowski's hogweed

Heracleum sosnowskyi (Plantae: Tracheophyta)

1. Photos



Heracleum sosnowskyi © Gergely KIRÁLY (All Rights Reserved) (1)



Heracleum sosnowskyi © Gergely KIRÁLY (All Rights Reserved) (2)



Heracleum sosnowskyi © I, Hugo.org (Creative Commons Attribution-Share Alike 3.0 Unported)



Heracleum sosnowskyi © Salicyna (Creative Commons Attribution-Share Alike 4.0 International)

2. What does it look like?

- herb up to 3 m high
- firm stem, sparsely hairy, with purple blotches
- leaves broad, up to 50 cm long, with upper surface hairless and below slightly hairy
- flowers white to pinkish, in compound umbels

- seeds egg-shaped, densely hairy when unripe

3. Confusion with similar species

- closely related and very similar to *Heracleum mantegazzianum*
- their distinction requires specialist expertise

4. Where does it live?

- terrestrial, mostly found in urban areas: gardens, roadsides, parks, but also in grasslands and near rivers and lakes

5. Behaviour

- develops large dense stands
- perennial
- flowers during summer

6. Invasion history

- native to the eastern main Caucasian ridge
- introduced as an ornamental plant and for honey production
- overwhelms native species
- can cause riverbank erosion
- toxic to humans; skin burning after physical contact

7. Further information

- <https://www.nobanis.org/globalassets/speciesinfo/h/heracleum-sosnowskyi/heracleum-sosnowskyi.pdf>
- <http://www.cabi.org/isc/datasheet/108958>
- https://en.wikipedia.org/wiki/Heracleum_sosnowskyi

8. Distribution in your current place

- map with APP distribution records near the user's area

9. Report new record

- appropriate link

Fanwort

Cabomba caroliniana (Plantae: Tracheophyta)

1. Photos



Cabomba caroliniana – Fanwort © RPS group Plc



Cabomba caroliniana – Fanwort © RPS group Plc



Cabomba caroliniana © Leslie J. Mehrhoff, University of Connecticut (Creative Commons Attribution 3.0 Unported)



Cabomba caroliniana © Leslie J. Mehrhoff, University of Connecticut (Creative Commons Attribution 3.0 Unported) II

2. What does it look like?

- an herbaceous, fully submersed aquatic plant
- short fragile rhizomes grow on bottom
- stems green, branched, up to 6 m long, can reach the surface
- submersed leaves opposite, finely divided giving a feathery fan-like aspect
- occasionally floating leaves present, blade-shaped
- flowers floating, small, white to yellow or purplish

3. Confusion with similar species

- could be confused with similar aquatic species
- can be distinguished by its flowers

4. Where does it live?

- freshwater species, grows rooted in the mud
- prefers stagnant to slow flowing freshwater
- prefers a warm, humid climate but can survive freezing

5. Behaviour

- perennial, can survive free-floating for many weeks
- forms dense crowded stands
- spreads through stem fragments or rhizomes
- highly tolerant of anaerobic conditions

6. Invasion history

- native to subtropical temperate areas of eastern America
- commonly sold as aquarium plant due to its delicate appearance
- extremely persistent and competitive
- decreases the biodiversity of native aquatic plants
- can clog drainage canals and freshwater streams interfering with recreational, agricultural, and aesthetic uses

7. Further information

- <http://www.issg.org/database/species/ecology.asp?si=402&fr=1&sts=&lang=EN>
- <http://www.ecy.wa.gov/programs/wq/plants/weeds/aqua006.html>
- <http://www.cabi.org/isc/datasheet/107743>

8. Distribution in your current place

- map with APP distribution records near the user's area

9. Report new record

- appropriate link

American grey squirrel

Sciurus carolinensis (Animalia: Mammalia)

1. Photos



Sciurus carolinensis - Grey Squirrel -
GBNNS © Crown Copyright 2009



Sciurus carolinensis - Grey Squirrel 2 -
GBNNS © Crown Copyright 2009



Sciurus carolinensis - Photo from
www.nobanis.org, photographer: Merike
Linnämagi



Sciurus carolinensis - Photo from
www.nobanis.org, photographer: Merike
Linnämagi

2. What does it look like?

- a medium-sized tree squirrel up to 50 cm long including tail
- back grizzled dark to pale grey
- hips, feet and head olive brown
- tail white to pale grey

3. Confusion with similar species

- None

4. Where does it live?

- broadleaf woodlands and conifer forests
- urban parks

5. Behaviour

- spends most of its time on the ground
- feeds on nuts, flowers, buds, fruits, fungi, some insects, bird eggs
- pilfers the caches of red squirrels

6. Invasion history

- native to the USA
- introduced as a pet
- can damage trees by stripping the bark, exposing them to fungi and insects
- may cause local extinction of the red squirrel through competition and diseases

7. Further information

- <http://www.cabi.org/isc/datasheet/49075>
- http://www.europe-aliens.org/pdf/Sciurus_carolinensis.pdf
- <http://www.issg.org/database/species/ecology.asp?si=65&fr=1&sts=&lang=EN>

8. Distribution in your current place

- map with APP distribution records near the user's area

9. Report new record

- appropriate link

African elodea

Lagarosiphon major (Plantae: Tracheophyta)

1. Photos



2. What does it look like?

- a submerged aquatic plant
- roots attach on the bottom
- stem brittle, sparsely branched, up to 6 m long
- leaves dark green, alternately/spirally placed around the stem, often crowded towards the apex
- female flower very small, with three white/pink petals

3. Confusion with similar species

- similarity with *Egeria densa*, *Elodea Canadensis* and *Hydrilla verticillata*
- its leaves are curved at their tips and are distinguishably alternately/spirally placed around the stem

4. Where does it live?

- lakes, slow moving rivers, wetlands, riparian zones, canals, drainage ditches
- prefers cool waters in areas sheltered from wind and current
- grows best under high light intensity

5. Behaviour

- can grow in dense mats up to 2-3 m thick
- only the female plant known to occur outside of its native range
- all reproduction in its introduced range is done in the form of vegetative propagation

6. Invasion history

- native to South Tropical Africa
- introduced through aquarium and water garden trade
- can cause negative environmental and economic impacts (displacing native plant species, decreasing water quality, blocking hydroelectric intakes, impeding recreational activities, diminishing aesthetic value)

7. Further information

- <http://www.cabi.org/isc/datasheet/30548>

8. Distribution in your current place

- map with APP distribution records near the user's area

9. Report new record

- appropriate link

Chinese mitten crab

Eriocheir sinensis (Animalia: Arthropoda)

1. Photos



Eriocheir sinensis - Chinese Mitten Crab - Food and Environment Research Agency (Fera) © Crown Copyright 2009



Eriocheir sinensis - Chinese Mitten Crab - © Acteon.nl (All rights reserved)



Eriocheir sinensis - Photo from www.nobanis.org, Photographer: Stephan Gollash



Eriocheir sinensis - Photo from www.nobanis.org, Photographer: Stephan Gollash

2. What does it look like?

- a rather small crab, up to 8 cm in width
- brownish to greenish
- characterised by a "fur" of dense mat of hairs on its claws
- carapace subquadrate, markedly convex, with four acute spines on either side

3. Confusion with similar species

- easily distinguishable by its "fur" on its claws

4. Where does it live?

- shallow waters of rivers, lakes, estuaries
- coastal marine areas

5. Behaviour

- omnivorous non-discriminatory predator
- feeds on various plants, invertebrates, small fishes
- active migration: larvae occur in marine coastal waters and juveniles migrate upstream; adults migrate downstream to the sea for reproduction

6. Invasion history

- native to the Far East
- introduced through shipping and aquarium trade
- can outcompete native species through predation and overlapping dietary
- its burrowing activity can lead to the erosion of river banks
- can damage fishing gear
- intermediate host of lung flukes in East Asia

7. Further information

- <http://www.cabi.org/isc/datasheet/84120>
- http://www.europe-aliens.org/pdf/Eriocheir_sinensis.pdf
- <http://www.ciesm.org/atlas/Eriocheirsinensis.php>

8. Distribution in your current place

- map with APP distribution records near the user's area

9. Report new record

- appropriate link

Floating pennywort

Hydrocotyle ranunculoides (Plantae: Tracheophyta)

1. Photos



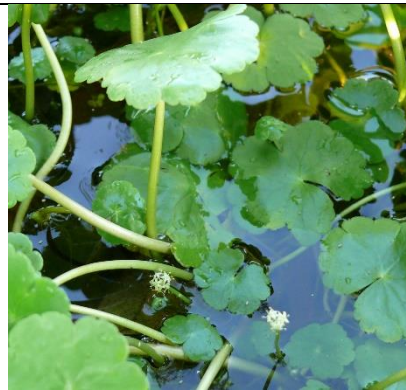
Hydrocotyle ranunculoides - Floating Pennywort - GBNNSS © Crown Copyright 2009



Hydrocotyle ranunculoides - Floating Pennywort - CCW © Crown Copyright 2009



Hydrocotyle ranunculoides Floating Pennywort © Snowdonia National Park Authority



Hydrocotyle ranunculoides Floating Pennywort © Snowdonia National Park Authority II

2. What does it look like?

- aquatic stoloniferous plant, floating on water
- stems horizontal, bear nodes at rather regular intervals
- dense mats of roots at each node as well as elongated erected stalks
- leaves kidney-shaped of various sizes (2-15 cm)
- flowers small, 3 mm in diameter, whitish to yellowish, borne in small clusters of 5-13
- fruits brownish, ovoid-ellipsoid, strongly flattened dorsally

3. Confusion with similar species

- similar with other species of the genus

- can be distinguished by its leaf margin which is split to central petiole, and by its overlapping marginal lobes

4. Where does it live?

- stagnant and slowly running water of rivers, streams, ponds, lakes, ditches

5. Behaviour

- a fast growing species
- forms extensive floating mats on the water surface
- thrives under highly eutrophic conditions
- prefers sun exposure and can resist to European winters, since its submerged parts can persist under ice cover

6. Invasion history

- native to North and South America
- introduced in Europe through ornamental and aquarium trade
- can outcompete native aquatic plants
- blocks water control structures and can lead to flooding events
- can create problems to boat navigation and water recreational uses

7. Further information

- <http://www.cabi.org/isc/datasheet/28068>
- https://www.nobanis.org/globalassets/speciesinfo/h/hydrocotyle-ranunculoides/hydrocotyle_ranunculoides.pdf

8. Distribution in your current place

- map with APP distribution records near the user's area

9. Report new record

- appropriate link

North American bullfrog

Lithobates catesbeianus (Animalia: Amphibia)

1. Photos



Lithobates catesbeianus © Derek Ramsey (Creative Commons Attribution-Share Alike 2.5 Generic, 2.0 Generic and 1.0 Generic)



Lithobates catesbeianus © Alan D. Wils (Creative Commons Attribution-Share Alike 2.5 Generic)



Lithobates catesbeianus - American Bullfrog - GBNNSS © Crown Copyright 2009



© Riccardo Scalera
Lithobates catesbeianus - American Bullfrog - © Riccardo Scalera (All Rights Reserved)

2. What does it look like?

- one of the largest frog species, reaching 18 cm long and 0.5 kg weight
- olive to brownish with random dark spots on dorsal and lateral body parts, while abdominal side white
- head flat with conspicuous eardrums
- skin smooth
- limbs with inter-digital swimming webs

3. Confusion with similar species

- adult specimens very distinct but juvenile bullfrogs can easily be mistaken for other species

4. Where does it live?

- freshwater systems: lakes, ponds, marshes, generally in shallow still water
- prefers abundant aquatic vegetation

5. Behaviour

- during metamorphosis it converts from vegetarian tadpole to carnivore that can eat any animal, even juveniles of its own species
- hibernates to withstand below-freezing temperatures
- only the adult males produce the frog call

6. Invasion history

- native to Eastern North America
- intentional introduction for cultivation and human consumption
- can outcompete native amphibians
- the chorusing of large males sometimes considered as noise pollution
- reports of severe allergic reactions in some people who ingested bullfrogs

7. Further information

- <http://www.cabi.org/isc/datasheet/66618>
- http://www.europe-aliens.org/pdf/Lithobates_catesbeianus.pdf
- <http://www.issg.org/database/species/ecology.asp?si=80&fr=1&sts=&lang=EN>

8. Distribution in your current place

- map with APP distribution records near the user's area

9. Report new record

- appropriate link

American skunk-cabbage

Lysichiton americanus (Plantae: Tracheophyta)

1. Photos



Lysichiton americanus - American Skunk Cabbage - GBNNSS © Crown Copyright 2009



Lysichiton americanum - American Skunk Cabbage - © RPS group Plc



Lysichiton americanus © Kfediuk (Creative Commons Attribution-Share Alike 4.0 International)



Lysichiton americanus © Evelyn Simak (Creative Commons Attribution-Share Alike 2.0 Generic)

2. What does it look like?

- a tall herb reaching 1.5 m high
- basal rosette of leathery green leaves up to 1 m long
- flowers yellow, spatulate, up to 0.5 m long, enclosing one fleshy spadix
- fruits are green berries at the end of the spadix

3. Confusion with similar species

- distinguishable by its bright yellow flowers

4. Where does it live?

- wet woodlands
- grows best in nutrient rich soils

5. Behaviour

- perennial plant
- flowering during spring
- flowers attract insects (mainly flies) due to the strong smell that is emitted

6. Invasion history

- Native in Western North America
- introduced in Europe through horticulture
- can outcompete native mosses and orchid species

7. Further information

- <http://www.nonnativespecies.org/factsheet/downloadFactsheet.cfm?speciesId=2110>
- <http://www.cabi.org/isc/datasheet/31580>

8. Distribution in your current place

- map with APP distribution records near the user's area

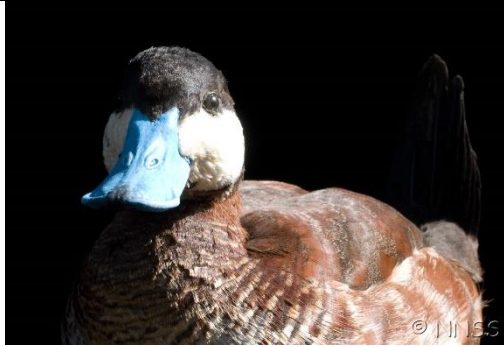
9. Report new record

- appropriate link

Ruddy duck

Oxyura jamaicensis (Animalia: Aves)

1. Photos



Oxyura jamaicensis - Ruddy Duck
Taxidermy specimen - GBNNSS © Crown
Copyright 2009



Oxyura jamaicensis - Ruddy Duck
Taxidermy specimen - GBNNSS ©
Crown Copyright 2009 II



Oxyura jamaicensis © Chris_huh
(Creative Commons Attribution-Share
Alike 4.0 International, 3.0 Unported, 2.5
Generic, 2.0 Generic and 1.0 Generic)



Oxyura jamaicensis © Calibas (Public
Domain)

2. What does it look like?

- a small diving duck, up to 45 cm long and 700 g in weight
- long (sometimes erect) tail
- males with a bright blue bill, black head, white cheeks and a reddish body
- females with brownish body, darker bill and a brown line along the cheeks

3. Confusion with similar species

- None

4. Where does it live?

- shallow pools, marshes, lakes

- sometimes in sheltered coastal areas
- prefers dense aquatic vegetation

5. Behaviour

- excellent divers
- omnivorous, feeding on small invertebrates, seeds and parts of aquatic plants
- nests are floating structures made of marsh plants
- seasonal dispersal in resident UK populations

6. Invasion history

- native to North and Central America
- introduced in Europe by escapes and accidental releases from breeding farms
- poses a threat to the endangered white-headed duck (*Oxyura leucocephala*) through hybridization and competition

7. Further information

- http://www.europe-aliens.org/pdf/Oxyura_jamaicensis.pdf
- <http://www.cabi.org/isc/datasheet/71368>
- http://animaldiversity.org/accounts/Oxyura_jamaicensis/

8. Distribution in your current place

- map with APP distribution records near the user's area

9. Report new record

- appropriate link

Raccoon

Procyon lotor (Animalia: Mammalia)

1. Photos



Procyon lotor - Raccoon - © Sugoto Roy



Procyon lotor - Photo from www.nobanis.org,
photographer: Inger Weidema



Procyon lotor © Bastique (Creative Commons
Attribution-Share Alike 3.0 Unported)



Procyon lotor © Darkone (Creative Commons
Attribution-Share Alike 2.5 Generic)

2. What does it look like?

- a medium-sized mammal with characteristic black mask
- fur grey, but occasionally blackish or reddish, it turns whitish on the flanks and legs
- limbs rather short
- tail bushy with 4-7 blackish rings

3. Confusion with similar species

- similar to *Nyctereutes procyonoides*, but the latter has 4-toed footprint (5-toed in raccoon) and does not have a ringed tail

4. Where does it live?

- almost all terrestrial habitats, but especially those adjacent to water
- occasionally in urbanized areas

5. Behaviour

- mostly nocturnal
- omnivore, its diet can be very diverse
- excellent climbing and swimming abilities
- can survive harsh winters by entering a dormant period
- females remain in their natal area

6. Invasion history

- native in Central and North America
- introduced in Europe through intentional (for hunting and fur) and accidental introductions
- common in the pet trade
- capability of adjusting to a wide range of habitats and climatic conditions
- can damage native fauna through predation and competition
- susceptible to a number of diseases, such as roundworms, which can have public health consequences

7. Further information

- https://www.nobanis.org/globalassets/speciesinfo/p/procyon-lotor/procyon_lotor.pdf
- http://www.europe-aliens.org/pdf/Procyon_lotor.pdf
- <http://www.cabi.org/isc/datasheet/67856>

8. Distribution in your current place

- map with APP distribution records near the user's area

9. Report new record

- appropriate link

Red-eared terrapin

Trachemys scripta (Animalia: Reptila)

1. Photos



Trachemys scripta - Red Eared Terrapin - GBNNSS © Crown Copyright 2009



Trachemys scripta - Red Eared Terrapin - © Riccardo Scalera (All Rights Reserved)



Trachemys scripta - Photo from www.nobanis.org, Photographer: Henrik Bringsøe



Trachemys scripta - Photo from www.nobanis.org, Photographer: Henrik Bringsøe

2. What does it look like?

- a medium to large freshwater turtle, up to 40 cm long
- prominent yellow to red patches on each side of the head
- carapace and skin are olive brown with yellow stripes and spots
- males are usually smaller than females and have a long, thick tail

3. Confusion with similar species

- None

4. Where does it live?

- various freshwater habitats with quiet waters and soft bottoms
- prefers dense aquatic vegetation
- frequently found in public ponds

5. Behaviour

- an opportunistic omnivore
- can live up to 20 years in the wild and 40 years in captivity
- reproduction and mating may occur in spring and fall

6. Invasion history

- native in Eastern USA and adjacent areas
- introduced in Europe through pet and food trade
- very popular as a pet because of its small size and low price
- can outcompete native animals, including the endangered European pond turtle *Emys orbicularis*
- considered as a potential vector of Salmonella
- large individuals can inflict painful bites to humans

7. Further information

- http://www.europe-aliens.org/pdf/Trachemys_scripta.pdf
- <http://www.issg.org/database/species/ecology.asp?si=71&fr=1&sts=&lang=EN>
- <http://www.cabi.org/isc/datasheet/61560>

8. Distribution in your current place

- map with APP distribution records near the user's area

9. Report new record

- appropriate link

Water hyacinth

Eichhornia crassipes (Plantae: Tracheophyta)

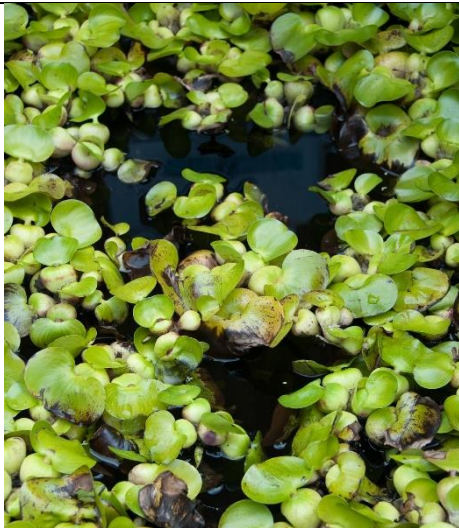
1. Photos



Eichhornia crassipes © Ted Center (Public Domain)



Eichhornia crassipes © Wouter Hagens (Public Domain)



Eichhornia Crassipes Water Hyacinth - GBNNSS © Crown Copyright 2009



Eichhornia Crassipes Water Hyacinth - GBNNSS © Crown Copyright 2009

2. What does it look like?

- an aquatic floating herbaceous plant, usually up to 0.5 m high
- stoloniferous roots, form dense extensive masses
- leaves thick, rounded, swollen
- leaf stalks bulbous, spongy
- flowers on a tall spike
- flowers large, purple and violet, with 6 petals, with a yellow central splotch

3. Confusion with similar species

- None

4. Where does it live?

- freshwater systems: lakes, wetlands, rivers and ponds

5. Behaviour

- spreads very rapidly
- form dense mats
- grows fast in eutrophicated waters

6. Invasion history

- originates from Brazil (Amazon basin)
- widely used as ornamental because of its beautiful flowers
- can alter the ecosystem and result in environmental degradation and native biodiversity loss
- adversely affects human activities (tourism, fishing, water transport)

7. Further information

- <http://www.cabi.org/isc/datasheet/20544>
- <http://www.issg.org/database/species/ecology.asp?si=70&fr=1&sts=&lang=EN>
- <https://www.youtube.com/watch?v=orjP5U3HeNU>

8. Distribution in your current place

- map with APP distribution records near the user's area

9. Report new record

- appropriate link

Water-primrose

Ludwigia grandiflora (Plantae: Tracheophyta)

1. Photos



Ludwigia grandiflora - Water Primrose -
GBNNS © Crown Copyright 2009



Ludwigia grandiflora - Water Primrose -
GBNNS © Crown Copyright 2009



Ludwigia grandiflora © Gergely KIRÁLY (All
Rights Reserved) (1)



Ludwigia grandiflora © Gergely KIRÁLY (All
Rights Reserved) (2)

2. What does it look like?

- emergent herbaceous aquatic plant, to 1 m high above water
- early growth leaves form rosette-like clusters
- leaves near flowers are lanceolate, alternate
- flowers solitary, with 5 petals, stalked, bright yellow

3. Confusion with similar species

- very similar to *Ludwigia peploides*
- can be distinguished by its vertically growing stems and larger flowers

4. Where does it live?

- slow-flowing freshwater habitats: streams, ponds, lakes, wetlands

5. Behaviour

- grows in varied conditions
- disperses through plant fragments
- forms extremely dense mats

6. Invasion history

- native to South and Central America
- introduced through aquarium trade and horticulture
- outcompetes native plant species
- reduces water oxygenation levels
- blocks water bodies and drainage systems
- impacts navigation and recreational activities

7. Further information

- <http://www.invasivespeciesscotland.org.uk/water-primrose-ludwigia-grandiflora/>
- <http://www.q-bank.eu/Plants/BioloMICS.aspx?Table=Plants%20-%20Species&Rec=64&Fields=All>
- <http://www.cabi.org/isc/datasheet/109148>

8. Distribution in your current place

- map with APP distribution records near the user's area

9. Report new record

- appropriate link

Floating primrose-willow

Ludwigia peploides (Plantae: Tracheophyta)

1. Photos



Ludwigia peploides - Water Primrose - GBNNSS
© Crown Copyright 2009



Ludwigia peploides © Eugene Zelenko (Creative Commons Attribution-Share Alike 4.0 International)



Ludwigia peploides © Marcia Stefani (Creative Commons Attribution 2.0 Generic)

2. What does it look like?

- emergent and floating herbaceous plant
- stems creeping over mud or shallow water, up to 3 m in length
- leaves long, oval, resemble those of willows
- leaves grow at alternating points along the stems
- named for its bright yellow, primrose-like flowers, 1-3 cm in diameter
- flowers have 5 petals and grow on a long stalk arising from a leaf axil

3. Confusion with similar species

- very similar to other *Ludwigia* species
- distinguished from *Ludwigia grandiflora* and *L. hexapetala* by its more horizontal stems and slightly smaller flowers

4. Where does it live?

- still or slow-flowing freshwater habitats: ponds, streams, rivers, lakes, wetlands

5. Behaviour

- can grow rapidly under a variety of conditions
- broken fragments can grow into new plants
- forms dense floating mats
- flowers between July and October
- vegetation dies back in winter leaving distinctive brown stems

6. Invasion history

- native to South America
- introduced as ornamental plant in ponds and gardens
- out-competes native plants
- can alter the aquatic habitat by reducing oxygen levels and shading other plants
- clog waterways, increasing the risk of flooding and affecting recreation, fishing and navigation
- creates a breeding habitat for mosquitoes

7. Further information

- <http://www.arkive.org/creeping-water-primrose/ludwigia-peploides/>
- <http://www.cabi.org/isc/datasheet/31673>

8. Distribution in your current place

- map with APP distribution records near the user's area

9. Report new record

- appropriate link

Parrot's feather

Myriophyllum aquaticum (Plantae: Tracheophyta)

1. Photos



Myriophyllum aquaticum - Parrots Feather -
GBNNS © Crown Copyright 2009



Myriophyllum aquaticum - Parrots Feather -
GBNNS © Crown Copyright 2009



Myriophyllum aquaticum © André Karwath aka
Aka (Creative Commons Attribution-Share Alike
2.5 Generic)



Myriophyllum aquaticum © André Karwath aka
Aka (Creative Commons Attribution-Share Alike
2.5 Generic) II

2. What does it look like?

- submerged / emergent aquatic plant
- stems elongate to 2 m long, suspended in the water column and/or floating
- leaves finely pinnately divided, feather-like, in whorls of mostly 5
- both submersed and emergent leaves, the latter resembling small "fir trees"
- flowers emerge from axils of leaves

3. Confusion with similar species

- the emergent small "fir trees" distinguishes it from similar species

4. Where does it live?

- slow-moving freshwater habitats: ponds, lakes, canals
- usually in muddy bottoms

5. Behaviour

- prefers good light, warm and high-nutrient environments
- can form dense mats
- small fragments root easily in mud to establish new colonies
- in Europe all plants are female

6. Invasion history

- native to South America
- commonly sold for aquaria and aquatic gardens
- outcompetes native aquatic plants
- can cause water deoxygenation
- impedes boats and clogs drainage ditches
- provides habitat for mosquitos

7. Further information

- <http://www.nonnativespecies.org/factsheet/downloadFactsheet.cfm?speciesId=2285>
- <http://www.cabi.org/isc/datasheet/34939>
- <http://www.issg.org/database/species/ecology.asp?si=401>

8. Distribution in your current place

- map with APP distribution records near the user's area

9. Report new record

- appropriate link

Siberian chipmunk

Tamias sibiricus (Animalia: Mammalia)

1. Photos



Tamias sibiricus © Alpsdake (Creative Commons Attribution-Share Alike 3.0 Unported)



Tamias sibiricus © Alpsdake (Creative Commons Attribution-Share Alike 3.0 Unported)



Tamias sibiricus © AndiW (public Domain)



Tamias sibiricus © J. Patrick Fischer (Creative Commons Attribution-Share Alike 3.0 Unported)

2. What does it look like?

- small striped squirrel, up to 25 cm long, including the tail
- fur greyish-brownish
- bushy greyish tail
- back covered by 5 longitudinal black dorsal stripes

3. Confusion with similar species

- closely resembles the eastern chipmunk: *Tamias striatus*
- distinguished by the arrangement of the dorsal black and white stripes

4. Where does it live?

- terrestrial, in suburban forests and urban parks

5. Behaviour

- shelters in burrows on the ground or in cavities in trees, holes in old walls or buildings
- hibernates in a burrow from October up to April
- omnivorous, its diet includes both plant and animal matter

6. Invasion history

- native from northern parts of European Russia to central China and Korea
- introduced in Europe as a pet
- major reservoir for the Lyme disease agent

7. Further information

- <http://www.cabi.org/isc/datasheet/62788>
- http://www.europe-aliens.org/pdf/Tamias_sibiricus.pdf
- <http://www.iucnredlist.org/details/21360/0>

8. Distribution in your current place

- map with APP distribution records near the user's area

9. Report new record

- appropriate link

Small Indian mongoose

Herpestes javanicus (Animalia: Mammalia)

1. Photos



Herpestes javanicus © Chung Bill Bill (Creative Commons Attribution 2.0 Generic)

2. What does it look like?

- slender long body up to 70 cm long, but with short legs
- fur soft, greyish to brownish
- head elongated with pointed muzzle
- ears short, slightly project from the fur
- tail muscular, gradually tapering
- paws with 5 clawed toes

3. Confusion with similar species

- reported from the Balkans mainly as *Herpestes auropunctatus*, which is tentatively considered as a synonym of *H. javanicus*

4. Where does it live?

- terrestrial: deciduous forests, shrublands and grasslands, urban areas
- prefers dry habitats

5. Behaviour

- generalist carnivore, with varied diet
- seldom climbing trees
- can adapt to a range of temperatures
- can stand erect on hind feet supported by its muscular tail
- breeds two or three times a year

6. Invasion history

- native in Asia, from Iraq to Myanmar, and from Pakistan to India
- introduced to control rats and snakes, but proved not particularly effective
- can lead to decline of native mammals, birds, reptiles, and amphibians through predation
- carriers of human and animal diseases, including rabies and human *Leptospira* bacterium

7. Further information

- <http://www.issg.org/database/species/ecology.asp?si=86&fr=1&sts=&lang=EN>
- <http://www.iucnredlist.org/details/41614/0>
- <http://www.cabi.org/isc/datasheet/80508>

8. Distribution in your current place

- map with APP distribution records near the user's area

9. Report new record

- appropriate link

Coypu

Myocastor coypus (Animalia: Mammalia)

1. Photos



Myocastor coypus – Coypu – GBNNSS, Wildwood Trust © Crown Copyright 2009



Myocastor coypus – Coypu – GBNNSS, Wildwood Trust © Crown Copyright 2009



Myocastor coypus - photo from www.nobanis.org, Photographer: Bo Oelenschlaeger Madsen



Myocastor coypus - photo from www.nobanis.org, Photographer: Bo Oelenschlaeger Madsen

2. What does it look like?

- large semi-aquatic rodent, up to 6-7 kg and 1 m long including tail
- rat-like appearance
- pelage brown
- short legs

- long cylindrical tail
- webbed hindfeet

3. Confusion with similar species

- similar to musk rat (*Ondatra zibethicus*), but much bigger in size and tail cylindrical (laterally flattened in musk rats)

4. Where does it live?

- always near freshwater systems: rivers, lakes, marshes, drainage canals

5. Behaviour

- excellent swimmers
- mainly herbivorous
- fast colonizers
- can breed throughout the year
- severe winter can reduce reproductive success and adult survival

6. Invasion history

- native to South America
- introduced through escapes or releases from fur farms
- declines native plants through herbivory
- can destroy bird nests and preys on eggs
- their burrows penetrate and damage river banks, dykes and irrigation facilities
- responsible for economic damages to agricultures

7. Further information

- http://www.europe-aliens.org/pdf/Myocastor_coypus.pdf
- <http://www.issg.org/database/species/ecology.asp?si=99&fr=1&sts=&lang=EN>
- <http://www.cabi.org/isc/datasheet/73537>

8. Distribution in your current place

- map with APP distribution records near the user's area

9. Report new record

- appropriate link

Fox squirrel

Sciurus niger (Animalia: Mammalia)

1. Photos



Sciurus niger © Calibas (Creative Commons Attribution 3.0 Unported)



Sciurus niger © Cody Hough (Creative Commons Attribution-Share Alike 3.0 Unported)



Sciurus niger © Ilona Loser (Creative Commons Attribution-Share Alike 3.0 Unported)



Sciurus niger © Markus Krötzsch (Creative Commons Attribution-Share Alike 3.0 Unported)

2. What does it look like?

- a medium-sized tree squirrel, up to 70 cm long
- long foxtail-like tail
- upper body brown-grey to brown-cinnamon with a typically brownish-orange underside
- sharp claws

3. Confusion with similar species

- None

4. Where does it live?

- open woodland, with little understory vegetation
- urban areas

5. Behaviour

- use leaf nests or tree cavities for shelter and litter rearing
- tolerant of human proximity but not particularly playful
- strictly diurnal, non-territorial
- spend most of their time on the ground
- impressive jumpers
- excellent vision and well-developed senses of hearing and smell

6. Invasion history

- native to North America
- introduced for hunting and as a pet
- can outcompete other native squirrels

7. Further information

- <http://www.iucnredlist.org/details/20016/0>
- <http://www.cabi.org/isc/datasheet/64742>
- https://en.wikipedia.org/wiki/Fox_squirrel

8. Distribution in your current place

- map with APP distribution records near the user's area

9. Report new record

- appropriate link

Muntjac deer

Muntiacus reevesi (Animalia: Mammalia)

1. Photos



Muntiacus reevesi – Muntjac © Norma Chapman



Muntiacus reevesi – Muntjac - taxidermy specimen- GBNNSS © Crown Copyright 2009



Muntiacus reevesi © Karel Jakubec (Creative Commons Attribution-Share Alike 3.0 Unported)



Muntiacus reevesi © MargoZ (Creative Commons Attribution-Share Alike 4.0 International, 3.0 Unported, 2.5 Generic, 2.0 Generic and 1.0 Generic)

2. What does it look like?

- small reddish-brown deer, to 0.5 m high (at the shoulder)
- conspicuous white underside
- fat tail
- males with short simple antlers
- facial markings: males with black frontal stripes, forming a "V"
- females with a dark kite-shaped pattern on the forehead

3. Confusion with similar species

- None

4. Where does it live?

- terrestrial: deciduous woodlands, parks

5. Behaviour

- a seasonal breeder, breeding throughout the year
- feed on ferns, fungi, broad-leaved trees, shrubs, nuts, fruits
- basically solitary
- called also the barking deer, due to its distinctive bark, though this name is also used for other deer
- when disturbed they often run off in a series of springing jumps

6. Invasion history

- native to southeast China and Taiwan
- introduced deliberately for hunting or escaped from zoos
- grazing can effect diversity of plant species, with indirect effects on fauna
- damage horticulture

7. Further information

- <http://www.cabi.org/isc/datasheet/74281>
- <http://www.iucnredlist.org/details/42191/0>
- https://en.wikipedia.org/wiki/Reeves%27s_muntjac

8. Distribution in your current place

- map with APP distribution records near the user's area

9. Report new record

- appropriate link

South America coati

Nasua nasua (Animalia: Mammalia)

1. Photos



Nasua nasua © Adrian Pingstone (Public Domain)



Nasua nasua © Aga Kazmierczak (Public Domain)



Nasua nasua © MatthiasKabel (Creative Commons Attribution-Share Alike 3.0 Unported)



Nasua nasua © Vassil (Public Domain)

2. What does it look like?

- similar to raccoon, up to 1 m long including tail
- reddish-brown fur, whitish belly
- elongated, flexible snout
- white spots around its eyes
- ears short and rounded
- banded tail with yellow rings

3. Confusion with similar species

- None

4. Where does it live?

- terrestrial: various kinds of forests and wetlands

5. Behaviour

- its name 'coati' comes from native American Indian words meaning 'belt' and 'nose', referring to the way coatis tuck their nose into their belly while sleeping
- omnivorous, eating invertebrates and fruits
- males solitary, but females travel in groups of up to 30 individuals
- usually active during the day, spends its nights sleeping in trees
- spends much of its time foraging in trees, but can also be found on the ground
- its elongated snout is very useful for searching crevices and holes for food

6. Invasion history

- native in South America
- escaped from zoos
- no ecosystem impacts are known but it could become an important predator or competitor with native species

7. Further information

- <http://www.iucnredlist.org/details/41684/0>
- <http://www.nonnativespecies.org//factsheet/factsheet.cfm?speciesId=2324>
- <http://www.arkive.org/south-american-coati/nasua-nasua/>

8. Distribution in your current place

- map with APP distribution records near the user's area

9. Report new record

- appropriate link

Sacred ibis

Threskiornis aethiopicus (Animalia: Aves)

1. Photos



Threskiornis aethiopicus - Sacred Ibis -
Taxidermy specimen - GBNNSS © Crown
Copyright 2009



Threskiornis aethiopicus - Sacred Ibis -
Taxidermy specimen - GBNNSS © Crown
Copyright 2009



Threskiornis aethiopicus © Christiaan Kooyman
(Public Domain)



Threskiornis aethiopicus © Johan Wessels
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2. What does it look like?

- large white bird, 90 cm long and up to 120 cm wingspan
- head and neck black, without feathers
- long black legs
- bill long, curved, black

3. Confusion with similar species

- None

4. Where does it live?

- generally near water
- grasslands, marshes, estuaries, farmyards, rubbish dumps, suburban areas

5. Behaviour

- often forming large groups
- breeds in colonies up to hundreds of pairs
- carnivorous with a tendency to omnivory
- feeds on insects, fishes, frogs, molluscs, crustaceans
- nomadic, able to change its breeding sites to suit environmental conditions
- nests often closely aggregated in trees, bushes and on ground near water

6. Invasion history

- native to Africa
- escaped from zoos
- feeds on several threatened species (insects, batrachians, etc.)
- feeds on eggs of several protected bird colonies
- competes successfully for nest sites with native birds
- suspected of spreading disease since it frequently forages in rubbish dumps and slurry pits

7. Further information

- <http://www.cabi.org/isc/datasheet/62201>
- http://www.europe-aliens.org/pdf/Threskiornis_aethiopicus.pdf
- <http://www.nonnativespecies.org/factsheet/factsheet.cfm?speciesId=3537>

8. Distribution in your current place

- map with APP distribution records near the user's area

9. Report new record

- appropriate link

Signal crayfish

Pacifastacus leniusculus (Animalia: Arthropoda)

1. Photos



Pacifastacus leniusculus - Signal Crayfish -
GBNNS © Crown Copyright 2009



Pacifastacus leniusculus - Photo from
www.nobanis.org, photographer: Merike
Linnamägi



Pacifastacus leniusculus - Signal Crayfish -
GBNNS © Crown Copyright 2009



Pacifastacus leniusculus - Photo from
www.nobanis.org, photographer: Merike
Linnamägi

2. What does it look like?

- large crayfish, up to 16 cm long
- smooth reddish-brown exoskeleton
- no spines on the shoulders of carapace
- claws robust, smooth, bright red
- white-turquoise patch on the claw junction

3. Confusion with similar species

- can be confused with the noble crayfish (*Astacus astacus*) but distinguished by:
- the lack of spines on the shoulders of carapace

- the white-turquoise patch on the claw junction

4. Where does it live?

- small streams to large rivers, lakes, brackish waters
- Europe so far: in almost all European countries

5. Behaviour

- high adaptability to a wide range of environments
- fast-growing with high fecundity
- opportunistic polytrophic feeder, consumes also detritus
- constructs burrows in river and lake banks

6. Invasion history

- native in northwestern USA
- used for restocking plague-devastated European crayfish
- significant grazing pressure on macrophytes, aquatic insects, snails, benthic fishes and amphibian larvae
- aggressive competitor to native crayfish species
- threat to the native noble crayfish due to transmission of the crayfish plague fungus

7. Further information

- https://www.nobanis.org/globalassets/speciesinfo/p/pacifastacus-leniusculus/pacifastacus_leniusculus1.pdf
- <http://www.cabi.org/isc/datasheet/70581>
- <http://www.issg.org/database/species/ecology.asp?fr=1&si=725>

8. Distribution in your current place

- map with APP distribution records near the user's area

9. Report new record

- appropriate link

Red swamp crayfish

Procambarus clarkii (Animalia: Arthropoda)

1. Photos



Procambarus clarkii - Red Swamp Crayfish ©
Trevor Renals



Procambarus clarkii - Red Swamp Crayfish ©
Trevor Renals

2. What does it look like?

- crayfish up to 12 cm long
- body shape cylindrical
- conspicuously granular carapace with marginal spines
- adults dark red, orange, or reddish brown
- chelae narrow and long, with bright red tubercles and spines
- sexually active males with distinct grasping hooks on the ischia, used to hold females during copulation

3. Confusion with similar species

- none

4. Where does it live?

- prefers small but permanent freshwater systems: swamps, ditches, sloughs, ponds
- avoids streams with a strong flow

5. Behaviour

- tolerant to a wide range of environmental conditions
- benthic and omnivorous, feeding on insects, larvae, detritus, etc., with a preference for animal matter
- burrows during periods of drought or cold
- tolerates dry periods of up to 4 months

- exhibits territorial behaviour and is aggressive with its own species

6. Invasion history

- native to north-eastern Mexico and south-central USA
- intentional introduced for aquaculture, but can spread also by anglers for local consumption, and as bait
- widely available in the aquarium trade
- outcompetes the native European crayfish (family Astacidae) through transmission of the crayfish fungus plague *Aphanomyces astaci*
- degrades riverbanks because of its burrowing activity
- accumulates heavy metals and toxins produced by Cyanobacteria, and can transfer them to its consumers, including humans

7. Further information

- http://www.europe-aliens.org/pdf/Procambarus_clarkii.pdf
- http://www.fao.org/fishery/culturedspecies/Procambarus_clarkii/en
- <http://www.cabi.org/isc/datasheet/67878>

8. Distribution in your current place

- map with APP distribution records near the user's area

9. Report new record

- appropriate link

Eastern crayfish

Orconectes limosus (Animalia: Arthropoda)

1. Photos



Orconectes limosus © A.Berger (Creative Commons Attribution-Share Alike 3.0 Unported)



Orconectes limosus © Andreas R. Thomsen (public domain)



Orconectes limosus © Astacoides (Creative Commons Attribution-Share Alike 3.0 Unported)

2. What does it look like?

- small to medium-sized crayfish, up to 10 cm long
- distinctive spiny cheeks
- legs with orange tips and striped abdomens, but are often coloured black from the sediment they live in

3. Confusion with similar species

- none

4. Where does it live?

- freshwater: rivers, wide streams, ponds, lakes
- prefers calm and turbid waters to fast flowing

- prefers flat, sandy, rocky floors

5. Behaviour

- tolerant of a wide range of environmental conditions
- omnivore
- high fecundity and rapid reproduction
- able to cope with polluted canals and lakes
- benthic, able to dig burrows and lie dormant when water levels fall and conditions are unfavourable

6. Invasion history

- native to North America
- originally introduced into Europe to replace diminished populations of the Signal crayfish
- escaped also from aquaria or introduced as fish bait
- can outcompete native crayfish species
- carrier of the crayfish plague
- its burrows may destabilize river banks

7. Further information

- https://en.wikipedia.org/wiki/Orconectes_limosus
- <http://www.nonnativespecies.org//factsheet/factsheet.cfm?speciesId=2441>
- <http://www.iucnredlist.org/details/153764/0>

8. Distribution in your current place

- map with APP distribution records near the user's area

9. Report new record

- appropriate link

Virile crayfish

Orconectes virilis (Animalia: Arthropoda)

1. Photos



Orconectes virilis © D. Gordon E. Robertson
(Creative Commons Attribution-Share Alike 3.0 Unported)

2. What does it look like?

- crayfish up to 11 cm long
- carapace smooth
- color reddish-brown to olive-brown
- chelae broad, flattened, tuberculate, rather blue
- chelae often have dark specs and orange or reddish tips

3. Confusion with similar species

- may be confused with other crayfishes, but can be distinguished by its broader, flattened tuberculate chela

4. Where does it live?

- freshwater: streams, rivers, canals, ponds, marshes, lakes
- flowing and still waters
- prefers warm waters of moderate turbidity with rocky-gravel substrates

5. Behaviour

- highly mobile, fecund and tolerant of a wide range of environmental conditions
- tends to hide in crevices under or between rocks rather than making burrows
- omnivorous, consumes a variety of live and dead animal and plant material

- cannot tolerate polluted waters

6. Invasion history

- native to North America
- introduced in Europe through accidental or deliberately aquarium releases
- can result in significant shift from clear to turbid waters
- can displace native fish and crayfish and reduces macroinvertebrate and macrophyte abundance and biodiversity
- carriers of crayfish plague which is lethal to the native European crayfishes

7. Further information

- <http://www.cabi.org/isc/datasheet/72034>
- <http://www.issg.org/database/species/ecology.asp?si=218>
- <http://www.iucnredlist.org/details/153831/0>

8. Distribution in your current place

- map with APP distribution records near the user's area

9. Report new record

- appropriate link

Amur sleeper

Perccottus glenii (Animalia: Actinopterygii)

1. Photos



Perccottus glenii © Andshel (Creative Commons Attribution-Share Alike 3.0 Unported)



Perccottus glenii © George Chernilevsky (Public Domain)



Perccottus glenii © Yuriy Kvach (Creative Commons Attribution-Share Alike 3.0 Unported) II



Perccottus glenii © Yuriy Kvach (Creative Commons Attribution-Share Alike 3.0 Unported)

2. What does it look like?

- a freshwater small/medium fish up to 25 cm long
- robust scaled body
- coloration rather dark; varies from greenish-olive to brownish-grey depending on substrate
- on the dorsal and lateral sides there are dark irregular spots and blotches
- large mouth with caniform teeth
- two dorsal fins: the first with 6-8 simple rays, the second with 2-3 simple and 8-12 branched rays

- males during spawning period become black with bright green spots on body

3. Confusion with similar species

- can be distinguished from other similar freshwater fishes by its two dorsal fins: the first with 6-8 simple rays, the second with 2-3 simple and 8-12 branched rays

4. Where does it live?

- freshwater fish: lakes, ponds, marshes, rivers
- prefers stagnant rivers with dense underwater vegetation and muddy substrate

5. Behaviour

- can tolerate poorly oxygenated water
- able to survive in dried out or completely frozen water bodies by digging itself into mud where it hibernates
- voracious predator, feeds on wide variety of invertebrates, tadpoles and fish
- males guard the eggs and pelagic larvae

6. Invasion history

- native to Asia: Russia, China, North Korea
- commonly kept in aquaria and used as live bait
- exhaust the entire food supplies, and can outcompete native species for the same food resources
- can have an adverse overall impact on native aquatic fauna

7. Further information

- <https://www.nobanis.org/species-alerts/perccottus-glenii/>
- <http://fishbase.org/summary/Perccottus-glenii.html>
- <http://www.cabi.org/isc/datasheet/110577>

8. Distribution in your current place

- map with APP distribution records near the user's area

9. Report new record

- appropriate link

Marbled crayfish

Procambarus fallax f. virginalis (Animalia: Arthropoda)

1. Photos



Procambarus marmoratus - Marbled crayfish -
Cefas © Crown Copyright 2009

2. What does it look like?

- medium-sized crayfish up to 10 cm long
- distinct, appealing marbled color pattern
- dark lateral horizontal stripes through the carapace
- dorsal carapace smooth, but lateral surface slightly granulated
- acute cervical spine present at each side and the cephalic section, bearing tubercles
- chelae relatively small, being two times shorter than the carapace length

3. Confusion with similar species

- distinguished from other crayfish species by the color pattern (a marble pattern with dark lateral horizontal stripes through the carapace and pleon)

4. Where does it live?

- freshwater: rivers, lakes, swamps, drainage ditches, fish ponds

5. Behaviour

- only females exist which lay unfertilized eggs that develop into genetically uniform offspring (parthenogenesis)
- high reproductive potential: one single specimen is sufficient to create a new population

- no males have ever been recorded
- fast growing species
- lives in open water during most of its life and burrows only under extreme conditions
- polytrophic omnivore

6. Invasion history

- native to North America
- one of the most widely distributed crayfish species in the international pet trade
- introduced after pet aquaria releases
- threatens native crayfish due to competition and transmission of the crayfish plague
- may have significant impact on fish populations

7. Further information

- <http://www.cabi.org/isc/datasheet/110477>
- <https://en.wikipedia.org/wiki/Marmorkrebs>
- <http://www.fws.gov/fisheries/ans/erss/uncertainrisk/Procambarus-fallax-f-virginalis-ERSS-revision-June2015.pdf>

8. Distribution in your current place

- map with APP distribution records near the user's area

9. Report new record

- appropriate link

Stone moroko

Pseudorasbora parva (Animalia: Actinopterygii)

1. Photos



Pseudorasbora parva - Topmouth Gudgeon
Taxidermy specimen - GBNNSS © Crown
Copyright 2009



Pseudorasbora parva - Topmouth Gudgeon -
Matt Brazier - Environment Agency © Crown
Copyright 2009



Pseudorasbora parva © Piet Spaans Viridiflavus
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Generic)



Pseudorasbora parva © Seotaro (cleaned up
and denoised by Estrilda, and edited by Laitche)
(Creative Commons Attribution-Share Alike 3.0
Unported)

2. What does it look like?

- small fish, up to 11 cm long
- color: back grey, light sides, yellowish-green to silver belly
- elongated body, slightly flattened on sides
- head flattened in its anterior part
- mouth clearly in top position
- lateral line complete, running in the middle of sides

3. Confusion with similar species

- None

4. Where does it live?

- freshwater systems: shallow lakes, carp ponds, irrigation canals, ditches

5. Behaviour

- zooplanktivorous
- able for rapid expansion
- saline intolerant, not occurring in brackish waters
- males guard the eggs until hatching, and aggressively drive away other fish

6. Invasion history

- native to East Asia, including Japan and parts of Korea and China
- introduced in Europe with stocking material of herbivorous fishes imported from China
- feeds on juvenile stages of many locally valuable native fish species
- vector of infectious diseases threatening both native and farmed fish in Europe
- probably contributed to a decrease in abundance of some native cyprinids

7. Further information

- http://www.europe-aliens.org/pdf/Pseudorasbora_parva.pdf
- https://www.nobanis.org/globalassets/speciesinfo/p/pseudorasbora-parva/pseudorasbora_parva.pdf
- <http://www.cabi.org/isc/datasheet/67983>

8. Distribution in your current place

- map with APP distribution records near the user's area

9. Report new record

- appropriate link

House crow

Corvus splendens (Animalia: Aves)

1. Photos



Corvus splendens © Dhruvaraj S (Creative Commons Attribution 2.0 Generic)



Corvus splendens © Donald Hobern (Creative Commons Attribution 2.0 Generic)



Corvus splendens © K Hari Krishnan (Creative Commons Attribution-Share Alike 2.0 Unported)



Corvus splendens © Lip Kee Yap (Creative Commons Attribution-Share Alike 2.0 Generic)

2. What does it look like?

- slender, medium-sized crow, to 40 cm long
- relatively long legs and large bill
- glossy black except for a well-defined smoky-grey "collar", from hindcrown to mantle and breast, the shade of which can vary
- bill and legs black, eyes black-brown
- tail black, fairly long with rounded end

3. Confusion with similar species

- distinguished from other crows by differences in eye color, body shape and calls

4. Where does it live?

- always near human settlements
- no populations are known to live independently of humans
- moves into surrounding farmlands and seashores to forage

5. Behaviour

- generalist, opportunistic
- intelligent, very gregarious and aggressive, have little fear of man
- nests mainly in large trees
- monogamous, pair for life
- omnivorous, feeding on fruits, birds, mammals, reptiles and garbage
- noisy birds, typically emitting a rather flat and nasal sounding “kaaa-kaaa”

6. Invasion history

- native to the Indian subcontinent
- deliberately introduced for cleaning refuse from towns
- unintentional introductions associated with increased global sea traffic and trade
- poses a risk to native avifauna
- food/crop theft
- noise nuisance
- possibly acting as carrier of human and animal disease

7. Further information

- <http://www.cabi.org/isc/datasheet/15463>
- <http://www.housecrow.com/>
- <http://www.issg.org/database/species/ecology.asp?si=1199>

8. Distribution in your current place

- map with APP distribution records near the user’s area

9. Report new record

- appropriate link

Parthenium weed

Parthenium hysterophorus (Plantae: Tracheophyta)

1. Photos



Parthenium hysterophorus © Biswarup Ganguly
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Parthenium hysterophorus © Ethel Aardvark
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Parthenium hysterophorus © Forest & Kim Starr
(Creative Commons Attribution 3.0 Unported)



Parthenium hysterophorus © Yercaud Elango
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2. What does it look like?

- annual, erect herb to 1.5 m high, with a deep taproot and basal rosette
- much branched
- stem rigid, becomes woody with age
- leaves pale green, deeply lobed, alternate on the stem

- leaves and stem covered by soft hairs
- flowers small, white, borne in branched terminal panicles
- seeds black, flattened, 2mm long with two thin, white scales

3. Confusion with similar species

- may be confused with ragweeds (*Ambrosia* spp.), but can be distinguished by the alternate leaves and white flowers

4. Where does it live?

- terrestrial plant, grows in any type of soil
- prolific in disturbed habitats: roadsides, railway tracks, rivers, creek banks
- also in villages, gardens, plant nurseries, crop fields

5. Behaviour

- aromatic, annual
- drought tolerate
- high seed production
- seeds small and light, spread by water, animals, vehicles, machinery
- aggressive colonizer of disturbed ground

6. Invasion history

- native to North and South America
- accidentally introduced
- replaces native flora due to allelopathy
- severe economic damages to crops
- consumption by livestock can taint meat
- pollen contains allergens that can cause reactions such as dermatitis and hay fever

7. Further information

- <http://www.cabi.org/isc/datasheet/45573>
- <https://www.business.qld.gov.au/industry/agriculture/species/declared-pests/weeds/parthenium>
- <http://www.issg.org/database/species/ecology.asp?si=153>

8. Distribution in your current place

- map with APP distribution records near the user's area

9. Report new record

➤ appropriate link

Mile-a-minute weed

Persicaria perfoliata (Plantae: Tracheophyta)

1. Photos



Persicaria perfoliata © Dalgial (Creative Commons Attribution-Share Alike 3.0 Unported) II



Persicaria perfoliata © Dalgial (Creative Commons Attribution-Share Alike 3.0 Unported)



Persicaria perfoliata © Leslie J. Mehrhoff (Creative Commons Attribution-Share Alike 3.0 Unported)



Persicaria perfoliata © Qwert1234 at ja.wikipedia (Creative Commons Attribution-Share Alike 3.0 Unported)

2. What does it look like?

- herbaceous scrambling vine, to 6 m high
- delicate, highly branched reddish stems

- stems covered by small curved spines
- leaves alternate, triangular, light green
- round leaf-like structures called *ocrea* surround the stem at intervals
- inconspicuous small white flowers arise from *ocrea*
- fruits green, turning blue when matured, arranged in clusters

3. Confusion with similar species

- similar to other vine species, but distinguished by the presence of spines and *ocrea*

4. Where does it live?

- terrestrial, common in forest edges, wetlands, stream banks and roadsides
- prefers moist areas, but can also grow on dry land

5. Behaviour

- climbing over shrubs and trees
- annual
- fast growing
- seeds spread through animals
- seeds also buoyant, can be spread by streams and floods

6. Invasion history

- native to eastern Asia
- unintentionally introduced in America via rhododendron nursery stock
- can smother native vegetation and climb into the tree canopy where it restricts light availability to plants below
- can be a pest plant on tree farms and horticultural crops
- used in Chinese medicine

7. Further information

- http://www.dcnr.state.pa.us/cs/groups/public/documents/document/dcnr_010249.pdf
- <http://www.cabi.org/isc/datasheet/109155>
- https://en.wikipedia.org/wiki/Persicaria_perfoliata

8. Distribution in your current place

- map with APP distribution records near the user's area

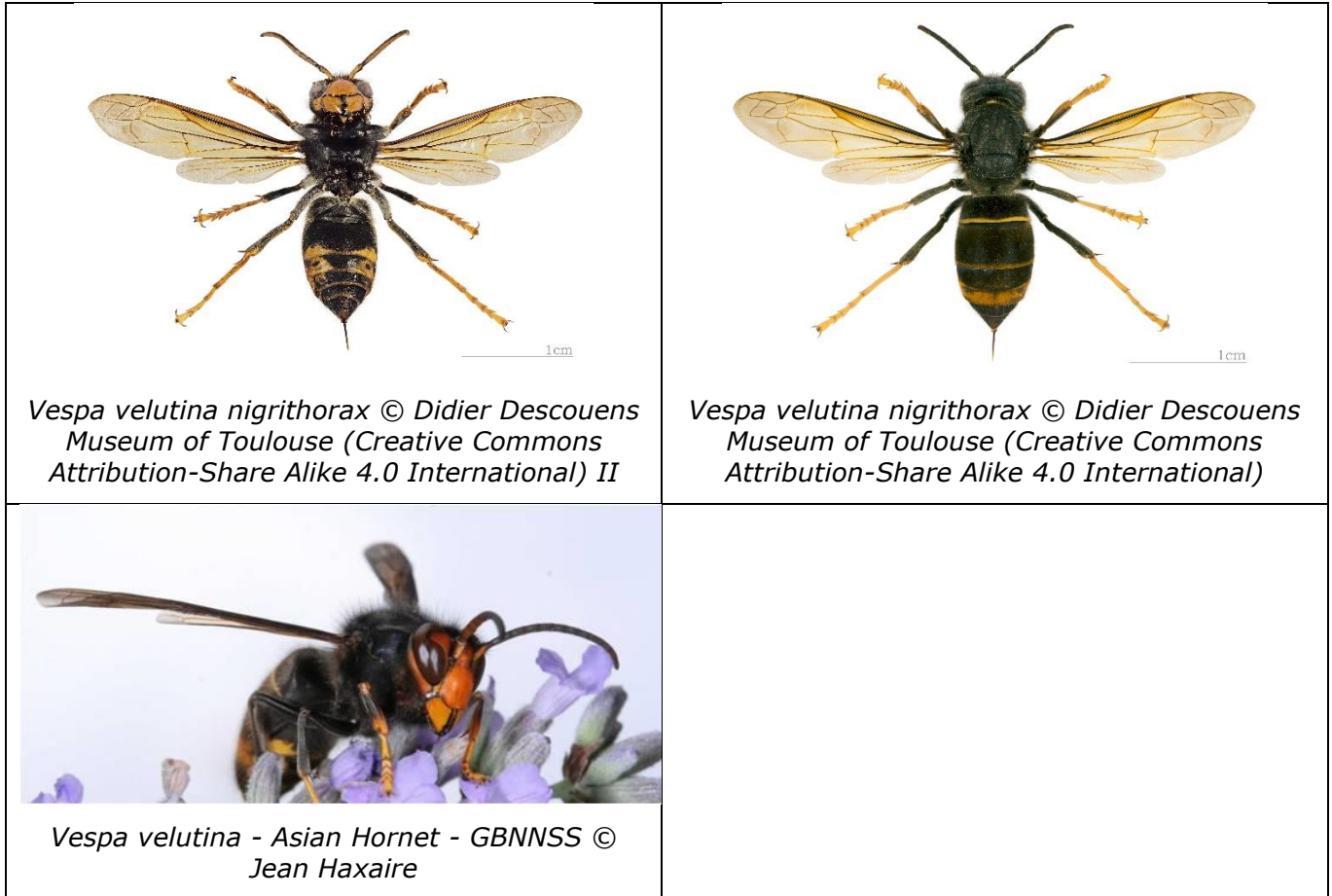
9. Report new record

- appropriate link

Yellow-legged hornet

Vespa velutina nigrithorax (Animalia: Insecta)

1. Photos



2. What does it look like?

- dark brown velvety body
- characteristically dark abdomen with a distinctive yellow band on the fourth segment
- head black and face yellow
- yellow tipped legs
- smaller than the native European hornet, workers to 2 cm long

3. Confusion with similar species

- distinguished by the European hornet by its smaller size, the characteristic yellow legs, and the dark abdomen with only one yellow band
- never active at night whereas European hornets may be

4. Where does it live?

- the paper nests are usually built in tree canopies, or occasionally in buildings, and very rarely near the ground

5. Behaviour

- hunts honey bees and other insects
- active in April-November
- makes very large nests, to 75 cm long, in tall trees in urban and rural areas
- only one mated queen is enough to start a new colony and initiate further spread
- ability to thermoregulate their nests to a constant temperature of around 30°C
- vigorously defends its hunting territory, chasing off any rivals

6. Invasion history

- native to Southeast Asia
- introduced in France through boxes of pottery from China
- highly aggressive predator of native honey bees
- could be dangerous for man by inducing a life-threatening allergic reaction or after multiple stings, similar to the native hornet stings

7. Further information

- <http://www.nonnativespecies.org/index.cfm?sectionid=47>
- https://en.wikipedia.org/wiki/Asian_predatory_wasp
- <http://www.cabi.org/isc/datasheet/109164>

8. Distribution in your current place

- map with APP distribution records near the user's area

9. Report new record

- appropriate link

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