Management of invasive alien species in Spain: a bibliometric review - Supplementary material 1

## Features, categories, and definitions used during literature characterisation:

The features and categories used to characterise the selected documents were based on previous bibliographic studies on invasive alien species (IAS) management (Bayliss et al. 2013, Matzek et al. 2014). They encompassed two different sets: one describing formal aspects (e.g. document type or text language) and the other, the document content (e.g. methodological approach, main topic, spatial scale). The entire set of features and categories with the corresponding definitions are listed in **Table S1**.

**Table S1**. Features, categories and definitions used to characterise the compiled literature (based on Andreu and Vilà 2007, Bayliss et al. 2013, Matzek et al. 2014).

| Feature | Categories | Definition |
| --- | --- | --- |
| Authors | - | Number of documents |
| Document type | Scientific article | Documents published in peer-reviewed journals listed in the Clarivate’s Journal Citation Reports (JCR) |
| Book | Peer-reviewed and non-peer reviewed books |
| Book chapter | Peer-reviewed and non-peer reviewed book chapters |
| Conference proceedings | Compilations of academic papers published in academic conferences or workshops |
| Report | Non-peer reviewed documents |
| Thesis | Master and PhD theses and dissertations |
| Ecological organisation level | Population or autoecology | Documents focusing on single species |
| Community or assemblage | Documents focusing on single taxa |
| Ecosystem | Documents focusing on multiple taxa, especially those addressing their relationships and IAS impacts on abiotic ecosystem components |
| Generic/Not applicable | Documents which did not focus on particular species, taxa, or groups of them or dealt with additional aspects related to invasion science which did not imply the direct manipulation of IAS |
| Ecosystem type | Terrestrial | Documents focusing on species mainly inhabiting non-aquatic territories |
| Inland waters | Documents focusing on species mainly inhabiting fresh waters |
| Marine | Documents focusing on species mainly inhabiting salt waters |
| Urban | Documents focusing on species mainly inhabiting urban (terrestrial) territories or whose main introduction pathway involves cities |
| Insular territory | Yes | Studies carried out or intended to manage IAS established in islands |
| No | Studies carried out or intended to manage IAS threatening or established in continental territories, which may be also useful for insular territories |
| Language | English | Documents written in English |
| Spanish | Documents written in Spanish |
| Main topic | Management (eradication and control) | Documents focusing on eliminating IAS or reducing the number of individuals and/or the extension of the distribution area |
| Prediction | Documents addressed to forecast IAS distribution, effects, and impacts to assist the process of decision-making |
| Prevention | Documents intended to impede the establishment and spread of IAS |
| Prioritisation (including risk management) | Documents ranking management actions |
| Regulation or decision-making | Documents indicating legislative changes to cope with IAS |
| Risk assessment | Documents ranking IAS probability of establishment and threat |
| Social | Documents engaging society to prevent the spread and establishment of IAS and to eradicate and/or control already established IAS |
| Biology or ecology | Documents focusing on IAS ecology with implications in the prevention of the establishment and spread of IAS which may also facilitate the eradication and control of these species |
| Climate change and other synergisms | Documents studying the impact of climate change on the establishment and spread of IAS |
| Conservation | Documents focusing on the conservation of native species, habitats, or prominent ecosystems when IAS are involved in the conservation statuses |
| Definitions | Documents that clarify nomenclature related to IAS |
| Economics | Documents forecasting or summarizing the costs related to IAS presence and/or management |
| Education and awareness-raising | Documents which suggested or reported approaches to increase consciousness and understanding about threats and impacts of IAS on non-scientific communities |
| Impacts | Documents describing or predicting IAS impacts |
| Information sharing, communication, and collaboration | Documents which suggested or reported approaches to spread knowledge on IAS, especially those documents involving media |
| Introduction or spread | Documents which studied introduction pathways and spread mechanisms |
| Survey or monitoring | Documents focusing on approaches to detect and foresee IAS presence |
| Management topic | Prevention | Documents that focused on approaches to impede the introduction and establishment of IAS and involve the direct manipulation of the target IAS |
| Eradication | Documents focusing on the elimination of IAS |
| Control | Documents focusing on reducing the number of individuals and/or the extension of the distribution area |
| Generic or not applicable | Documents which did not focus on prevention, eradication and/or control of IAS |
| Methodological approach | Review or meta-analysis | Documents addressed from a theoretical viewpoint (i.e. do not imply the direct manipulation of the target IAS) including reviews of former literature and dedicated meta-analyses |
| Observational field study | Documents inferring knowledge based on empirical data that may assist the process of IAS management (prevention, eradication and/or control) |
| Field experiment | Documents studying the success of different treatments to manage (prevent, eradicate and/or control) IAS |
| Greenhouse or laboratory experiment | Documents inferring knowledge based on empirical data, collected indoors, which may assist the process of IAS management (prevention, eradication and/or control) |
| Opinion paper | Documents addressed from a theoretical viewpoint reporting authors’ point of view related to IAS management |
| Theory | Documents reporting conceptual aspects of IAS management |
| Primary emphasis | Basic | Documents which did not involve the direct manipulation of the target taxa |
| Applied  | Documents which involve the direct manipulation of the target taxa |
| Interdisciplinary | Documents which additionally encompass social and policy issues |
| Protected area | Yes | Studies carried out or intended to manage IAS established in protected areas |
| No | Studies carried out or intended to manage IAS established outside protected areas |
| Spatial scale | Local | Documents reporting studies carried out in specific sites |
| Regional | Documents reporting studies carried out in multiple sites and or intermediate areas (e.g. county or province scale) |
| National | Documents reporting approaches that may affect most of the Spanish territory |
| Supranational | Documents reporting approaches that may affect several nations |
| Global | Documents reporting approaches that may involve most of the globe |
| Other or undefined | Documents reporting studies carried out indoors (e.g. greenhouse or lab experiment) or without geographic extent |
| Species | Target species | Specific species |
| Taxon | Groups of similar species |
| Generic or multiple taxa | IAS or multiple groups of similar species |
| Success | Yes | Document reporting the complete elimination (eradication) of the target IAS in the treated area or the accomplishment of the objectives of the treatment, which involved the manipulation of the target IAS |
| Partial | Document reporting the reduction of the number of individuals and/or the extension of the distribution area during the treatment (control) |
| No | Documents indicating the failure of the proposed treatment |
| Unknown | Documents which have not tested the proposed treatment |
| Not applicable | Documents which did not involve IAS management (prevention, eradication and/or control of IAS), even from a theoretical point of view (e.g. species distribution modelling studies) |
| Treatment | Regulation | Documents indicating legislative changes to cope with IAS |
| Awareness raising | Documents which suggested or reported approaches to increase consciousness and understanding about threats and impacts of IAS |
| Culling | Documents which advocate capturing and eliminating the target IAS |
| Biocontrol agent | Documents which studied or reported the use of predators or parasitic organisms to control established IAS |
| Poisoning | Documents which reported or suggested the use of poisons as a method to eradicate and/or control invasive animals |
| Hydrology manipulation | Documents which reported or suggested flow manipulation and water level control to counteract and manage IAS |
| Hydrogeomorphological restoration | Documents advocating the modification of the configuration of aquatic habitats to improve hydrologic dynamics and counteract IAS |
| Survey and monitoring | Documents which reported methods intended to survey, monitor, and predict the presence of IAS |
| Mechanical removal | Documents which reported or suggested mechanical removal (e.g. ploughing) as a method to eradicate and/or control invasive plants |
| Manual removal | Documents which reported or suggested manual removal (e.g. with hoes) as a method to eradicate and/or control invasive plants |
| Herbicide | Documents which reported or suggested the use of herbicide as a method to eradicate and/or control invasive plants |
| Genetic selection | Documents which used genetic selection to enhance resistance against IAS and/or organisms that counteracting IAS |
| Exclosure | Documents which used or suggested approaches to impede the entrance of IAS in specific, usually small, areas |
| Not applicable | Documents which dealt with additional aspects related to invasion science but did not advocate the direct manipulation of IAS |
| DNA metabarcoding | Documents which used DNA metabarcoding to survey and monitor the presence of IAS or to characterise species that may counteract established IAS |
| Reafforestation | Documents which advocated reafforestation with specific plants to counteract IAS spread and/or recolonization |
| Heating | Documents which used heat to eradicate and/or control IAS |
| Baiting | Documents which used baits to capture and subsequently eliminate IAS |
| Containment | Documents which advocated methods addressed to confine IAS restricting IAS spread |
| Mulching | Documents which advocated the use of mulches to impede the establishment of IAS |
| Prevention | Documents which advocated methods addressed to impede the establishment or spread of IAS |
| Restocking | Documents which advocated the restocking of animal species that counteract IAS |
| Incineration | Documents which used fire to eradicate and/or control IAS |
| Insecticide | Documents which reported or suggested the use of insecticides as a method to eradicate and/or control invasive insects |
| Sterilization | Documents which carried out or suggested animal sterilization as a method to control IAS |
| Year | - | Year when the document/study was published |