

Pathways of Introduction of Alien Species in Norway

This pdf file accompanies the data file `pathways.txt` and explains its contents.

In addition, a spreadsheet workbook (microsoft excel format) is available that contains the same information as the data file and this pdf file.

Together, this pdf file, the data file and the workbook constitute a dataset available at the Dryad Digital Repository:

Sandvik, H., Olsen, S. L., Töpper, J. P., & Hilmo, O. (2022). Data from: Pathways of introduction of alien species in Norway. *Dryad Digital Repository*.

This dataset contains the data underlying the following article:

Sandvik, H., Olsen, S. L., Töpper, J. P., & Hilmo, O. (2022). Pathways of introduction of alien species in Norway: analyses of an exhaustive dataset to prioritise management efforts. *Journal of Applied Ecology*.

For questions on the dataset, please contact the first author (hanno.sandvik@nina.no).

This pdf file contains the following sections:

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Information included

The pathways listed in this dataset were recorded in connection with the impact assessment of alien species carried out in Norway in 2018 (Sandvik et al. 2020). The assessments are available – in Norwegian only – in an online database: <https://artsdatabanken.no/fremmedartslista2018>. In the current dataset, a few errors were corrected (which are described in detail in the accompanying article mentioned above).

Format

The data file (`assess.txt`) is a table formatted in **plain text**. It has **8 columns** that are **semicolon-separated** (;), and **3054 rows** *plus* a **header**. The header contains the [variable names explained below](#). Each row corresponds to *one species-pathway* (i.e. to a unique combination of species and pathway subcategory).

Missing values

Missing values are represented as **"NA"** (without the quotation marks). The number of missing values for a given variable is provided in the column "Missing values" [below](#).

Special characters

A few remarks on characters that potentially cause trouble when importing the data:

- The column "Name" contains spaces (), single quotation marks (' ... '), hyphens (–), periods (.), crosses (×) and diacritics (ë, ø).
- The columns "Freq" and "Abund" contain hyphens (–) and mathematical symbols (<, >).

All remaining characters are alphanumeric (**A–Z**, **a–z**, **0–9**).

Importing the data in R

The **R** function `read.csv2` (using its default parameterisation) should do the job of importing the data and creating a data frame from them. (You might need to add `as.is=TRUE` if you do not wish character variables to be converted to factors.)

Retrieving species information

Information on the species contained in the current dataset is available from an earlier publication (Sandvik et al. 2020) and dataset ([dryad.8sf7m0cjc](https://doi.org/10.1016/j.dryad.2020.08.012)). The latter dataset can be coupled to the current one using the scientific species names.

Columns

The following table lists all column headings (variable names) of the data file (`pathways.txt`), and explains their meaning, variable type, value range etc.

<i>Column</i>	<i>Explanation</i>	<i>Type</i>	<i>Value range</i>	<i>Missing values</i>
Name	Scientific name of the species (taxon)	character	[text string]	0
Cat	Main pathway category	character	release, escape, contaminant, stowaway, corridor, unaided	0
Subcat	Pathway subcategory	character	44 different pathways (see below)	0
Introd	Introduction (if TRUE) or secondary spread (if FALSE)	logical	TRUE, FALSE	0
Freq	Frequency (<i>incidents per decade</i>)	character	<1, 1-8, 9-19, >19	583
Abund	Abundance (<i>individuals per incident</i>)	character	1, 2-10, 11-100, 101-1000, >1000	2952
Time	Timing of the incident*	character	historical, discontinued, current, future	233
Tgen	Generation time of the species (<i>years</i>)	numeric	0–50	1

*Note:

"historical" means "ceased and will not happen again", whereas "discontinued" means "ceased, but may happen again".

Subcategories

The following table lists the abbreviations used for pathway categories ("Cat") and subcategories ("Subcat") in the data file (`pathways.txt`). They are listed together with the terminology used by [CBD \(2014\)](#) and suggested by [Harrower et al. \(2020\)](#). (For further details on the interpretation, see the accompanying article.)

<i>Cat</i>	<i>Subcat</i>	<i>CBD (2014)</i>	<i>Harrower et al. (2020)</i>
release	BiologicalControl	Biological control	Biological control
release	ErosionControl	Erosion control / dune stabilization (windbreaks, hedges, ...)	Stabilisation & barriers
release	Fishery	Fishery in the wild (including game fishing)	Fishery in wild
release	Hunting	Hunting	Hunting
release	IntroductionConservation	Introduction for conservation purposes or wildlife management	Conservation in wild
release	LandscapeImprovement	Landscape/flora/fauna "improvement" in the wild	Aesthetic release
release	OtherIntentionalRelease	Other intentional release	Other release
release	ReleaseNatureUse	Release in nature for use (other than above, e.g., fur, transport, medical use)	—
escape	Agriculture	Agriculture (including biofuel feedstocks)	Agriculture
escape	AquacultureMariculture	Aquaculture/mariculture	Aquaculture
escape	BotanicalGardensZoos	Botanical garden / zoo / aquaria (excluding domestic aquaria)	Botanical gardens & zoos

<i>Cat</i>	<i>Subcat</i>	<i>CBD (2014)</i>	<i>Harrower et al. (2020)</i>
escape	FarmedAnimals	Farmed animals (including animals left under limited control)	Farmed animals
escape	Forestry	Forestry (including afforestation or reforestation)	Forestry
escape	FurFarms	Fur farms	Fur farms
escape	Horticulture	Horticulture	Horticulture
escape	LiveFood	Live food and live bait	Live food & live bait
escape	OrnamentalPurpose	Ornamental purpose other than horticulture	Ornamental
escape	OtherEscape	Other escape from confinement	Other escape
escape	PetAquariumTerrarium	Pet/aquarium/terrarium species (including live food for such species)	Pet
escape	Research	Research and ex-situ breeding (in facilities)	Research
contaminant	ContaminantAnimals	Contaminant on animals (except parasites, species transported by host/vector)	Contaminant of animals
contaminant	ContaminantNurseryMaterial	Contaminant nursery material	Nursery material contaminant
contaminant	ContaminantPlants	Contaminant on plants (except parasites, species transported by host/vector)	Contaminant of plants
contaminant	ContaminatedBait	Contaminated bait	Bait contaminant
contaminant	FoodContaminant	Food contaminant (including of live food)	Food contaminant
contaminant	OtherContaminants	—	Other contaminant
contaminant	ParasitesAnimals	Parasites on animals (including species transported by host and vector)	Parasite of animals
contaminant	ParasitesPlants	Parasites on plants (including species transported by host and vector)	Parasite of plants
contaminant	SeedContaminant	Seed contaminant	Seed contaminant
contaminant	TimberTrade	Timber trade	Timber trade contaminant
contaminant	TransportationHabitatMaterial	Transportation of habitat material (soil, vegetation, ...)	Habitat material contaminant
stowaway	AnglingFishingEquipment	Angling/fishing equipment	Fishing equipment
stowaway	ContainerBulk	Container/bulk	Container & bulk cargo
stowaway	HitchhikersAirplane	Hitchhikers in or on airplane	Airplane
stowaway	HitchhikersShipBoat	Hitchhikers on ship/boat (excluding ballast water and hull fouling)	Ship excluding ballast water or hull fouling
stowaway	MachineryEquipment	Machinery/equipment	Machinery & equipment
stowaway	OrganicPackingMaterial	Organic packing material, in particular wood packaging	Packing material
stowaway	OtherMeansTransport	Other means of transport	Other stowaway
stowaway	PeopleLuggage	People and their luggage/equipment (in particular tourism)	People & luggage
stowaway	ShipBoatBallast	Ship/boat ballast water	Ballast water
stowaway	ShipBoatHull	Ship/boat hull fouling	Hull fouling
stowaway	Vehicles	Vehicles (car, train, ...)	Land vehicles
corridor	InterconnectedWaterways	Interconnected waterways/basins/seas	Canals and artificial waterways
corridor	—	Tunnels and land bridges	Tunnels and bridges
unaided	NaturalDispersal	Natural dispersal	Natural dispersal