Title:
The ShareTrait Entity-Relationship Model: a step toward building the ShareTrait database

Date: last modified on 2024-11-02
Version: 1.0.0

Update:
[2024-11-02] Final version 1.0 completed, ready to be archived

Description:
This document contains the definition of tables used for building the ShareTrait database version 1.0. Version 1.0 is the adaptation of the ShareTrait dataset version 1.0.0, the data portal for making trait data interoperable and reusable.

Source:
The ShareTrait Dataset Version 1.0.0 (DOI: https://doi.org/10.5281/zenodo.8138904) is the source used for the design and development for the conceptual model, the logical and physical model for the ShareTrait DataBase.

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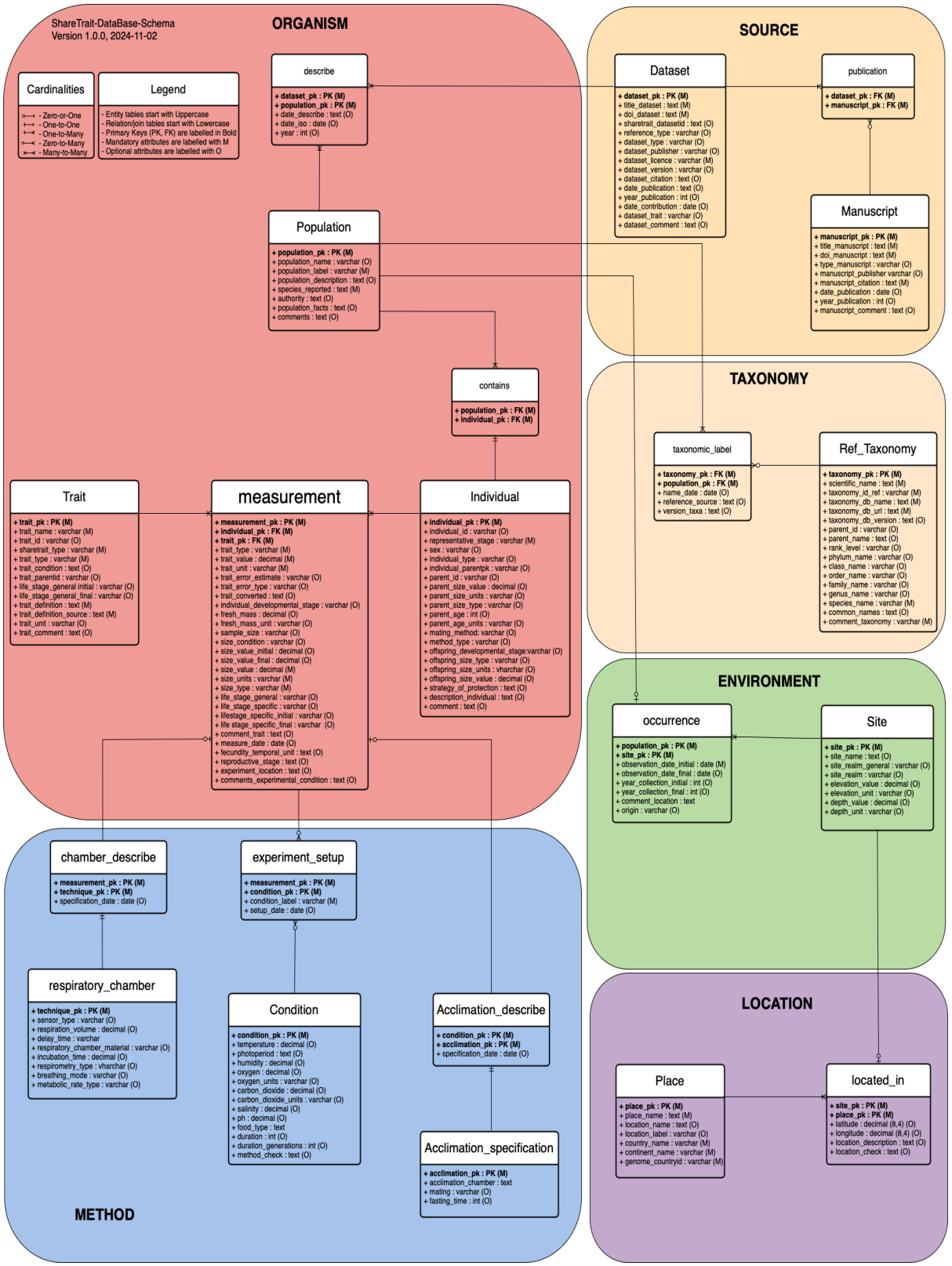
References:
- ShareTrait Dataset Github repository: https://github.com/ShareTraitProject/ShareTrait/tree/main/ShareTrait_DB
- ShareTrait Zenodo repository: https://zenodo.org/records/8138904
- ShareTrait DataBase Github repository: https://github.com/ShareTraitProject/ShareTraitDatabase
- ShareTrait DataBase Version 1.0.0 folder: https://github.com/ShareTraitProject/ShareTraitDatabase/tree/main/sharatrait-database-v1

Diagram:
ShareTrait-Database-Schema, version 1.0.0, last modified 2024-11-02

ShareTrait Dataset general information
The ShareTrait dataset contains 112 attributes annotated, defined in https://github.com/ShareTraitProject/ShareTrait/blob/main/ShareTrait_DB/v1.0.0/3_release/ShareTrait_MetaData_v1.0.0.csv. These annotations belong to 45 dataset records. The 45 records of version 1.0.0, belong to 3 main traits defined as "Development", "Fecundity" and "Metabolic Rate". For the development of the ShareTrait DataBase (ShareTrait DB), the ShareTrait DataSet attributes (ShareTrait DS) can be divided into blocks defined as Category blocks. Each Category contains a common collection of entities. For example, a Category defined as Publication may contain information about manuscript, journal, researcher, institute and so on. Categories are not physical aspects of the database; the aim of these categories is to guide us to know which region/s of the database we are focusing on and to which relevant collection of entities we are dealing with. The colouring labels are used to distinguish these regions of interest.

ShareTrait-Database-Schema, version 1.0.0, last modified



Category	Definition
Source	The research main source of information obtained from the scientific collection of investigations dealing with animal traits
Organism	Contains information regarding the individual animal groups of interest
Method	Contains relevant information of the investigation applied to the organisms collected for the study
Taxonomy	Contains information regarding the classification of the organisms
Environment	Information belonging to the geographical site of where the data is collected
Location	Geographical information regarding the spaces and physical items
Note	All text colour in purple shows the attribute mapping reference to sharetrait dataset

Category Source

Category	Source
Definition	Primary Relevant source of information for ShareTrait. Currently (v. 1.0.0), the information is made available by means of published datasets, relevant manuscripts, unpublished data and/or work, or direct contact with researchers
Comment	For Share Trait DataBase (STDB) v. 1.0.0, the dataset DOI is not a MANDATORY field, because of this, all other fields related to the DOI (e.g. dataset publisher, dataset licence, dataset version..) are defined as OPTIONAL fields. The fields that are MANDATORY are the primary key of the dataset (labelled as dataset_pk) and the reference dataset id (labelled as sharetrait_datasetid) that is required for mapping to ShareTrait dataset v. 1.0.0. Instead, as Manuscript is an Entity on its own, the DOI is a MANDATORY field.
Table Name	Dataset
Table Type	Entity
Definition	Primary relevant information of the dataset study regarding a trait
Comment	For Share Trait DataBase (STDB) v. 1.0.0, the dataset DOI is not a MANDATORY field. Because of this, all other fields related to the DOI (e.g. dataset publisher, dataset licence, dataset version..) are defined as OPTIONAL fields. The fields that are MANDATORY are the primary key of the dataset (labelled as dataset_pk) and the reference dataset id

	(labelled as sharetrait_datasetid) that is required for mapping to ShareTrait dataset v. 1.0.0.		
attribute_name	**type**	**definition**	**example**
dataset_pk	primary key, VARCHAR (30)	Primary Key of the Entity dataset, **MANDATORY**	TRADAT000001
title_dataset	TEXT	title of the dataset. It is usually obtained from the *title* attribute of the original data source. **OPTIONAL**	Overwintering strategies and life-history traits of different populations of Aphidius platensis along a latitudinal gradient in Chile
doi_dataset	VARCHAR (256)	dataset DOI, provided in URL (doi_dataset), **OPTIONAL**	https://doi.org/10.5281/zenodo.7774767
sharetrait_datasetid	ID, TEXT	reference id to sharetrait dataset (dataset_id), **MANDATORY**	Alfaro_Tapia_et_al_2022
reference_type	VARCHAR (64)	Indicate whether the reference corresponds to a primary or secondary reference (type_of_reference), **OPTIONAL**	primary
dataset_type	VARCHAR (64)	type of dataset, **OPTIONAL**	dataset
dataset_publisher	VARCHAR (64)	the name of repository where the dataset is published, **OPTIONAL**	zenodo
dataset_licence	VARCHAR (64)	licence of the dataset (license-check), **OPTIONAL**	Creative Commons Attribution 4.0 International
dataset_version	VARCHAR (64)	version of the dataset that is published, **OPTIONAL**	1.0
dataset_citation	TEXT	complete citation of the dataset, **OPTIONAL**	Alfaro-Tapia, A., Alvarez-Baca, J. K., Tougeron, K., Lavandero, B., Le Lann, C., & Van Baaren, J. (2022). Overwintering strategies and life-history traits of different populations of Aphidius platensis along a latitudinal gradient in Chile (1.0) [Data set]. Zenodo. https://doi.org/10.5281/zenodo.7774767
date_publication	TEXT	ISO date of the publication, **OPTIONAL**	2022-04-29
year_publication	INT	year of publication, **OPTIONAL**	2022
date_contribution	VARCHAR (64)	contribution date for uploading	2022-08-01

		the dataset in sharetrait, **OPTIONAL**	
dataset_trait	VARCHAR (64)	reference trait term used for the dataset, at the moment this is 1:1. **OPTIONAL**	development
dataset_comment	TEXT	free text remarks regarding the dataset, relevant to population and location, **OPTIONAL**	five Chilean populations of the aphid parasitoid Aphidius platensis.
comments_reference	TEXT	relevant notes about the reference, mostly specifying if the dataset has been published or not, (comments_reference), **OPTIONAL**	dataset not published
Table Name	Manuscript		
Table Type	Entity		
Definition	Information regarding the published article that describes the dataset or that is associated to the dataset		
Comment	The DOI value is a MANDATORY field for the Manuscript entity.		
attribute_name	**type**	**definition**	**example**
manuscript_pk	primary key, VARCHAR (30)	PK of manuscript, **MANDATORY**	TRAMAN001
title_manuscript	TEXT	title of the manuscript, **OPTIONAL**	Overwintering strategies and life-history traits of different populations of Aphidius platensis along a latitudinal gradient in Chile
doi_manuscript	VARCHAR (256)	manuscript DOI, provided in URL (doi_publication), **MANDATORY**	https://doi.org/10.1127/entomologia/2021/1186
type_manuscript	VARCHAR (64)	type of manuscript, can be a journal article, published data method, software paper. **OPTIONAL**	article
manuscript_publisher	VARCHAR (64)	publisher of the manuscript. **OPTIONAL**	Entomologia Generalis
manuscript_citation	TEXT	full citation of manuscript used for download. For now the type of citation is not provided. **OPTIONAL**	Hermaniuk, Adam et al. "Low Temperature and Polyploidy Result in Larger Cell and Body Size in an Ectothermic Vertebrate." *Physiological and biochemical zoology : PBZ* vol. 89,2 (2016):

			118-29. doi:10.1086/684974
date_publication	TEXT	ISO date of publication. **OPTIONAL**	2022-02-11
year_publication	INT	year of publication of the manuscript. **OPTIONAL**	2022
manuscript_comment	TEXT	free text remark for manuscript. **OPTIONAL**	study belonging to a range of species

Table Name	publication		
Table Type	Relation		
Definition	Association of a dataset to a published article		
Comment	This association does not currently exist in sharetrait, however it is relevant as there can be more than 1 dataset associated to a manuscript, or there can be more than 1 manuscript associated to a dataset (i.e. ShareTrait dataset_id)		
attribute_name	**type**	**definition**	**example**
dataset_pk	primary key, VARCHAR (30)	Reference to Dataset entity (foreign key)	TRADAT001
manuscript_pk	primary key, VARCHAR (30)	Reference to Manuscript entity (foreign key)	TRAMAN001

Association Rules for the Category Source

Relationship Dataset - Manuscript (through the Relational Table publication)

- A dataset is a mandatory entity for ShareTrait that contains information about study of trait(s).
- A manuscript is an entity that contains information about a published article describing a study and it is mandatory to provide a DOI.
- A dataset may be published, in this case it is OPTIONAL to provide a DOI of the dataset.
- A dataset can be part of a *publication* but not necessarily. A dataset can be part of multiple publications (0,N). (This is why the original 1,1 relationship is not possible and manuscript cannot be an attribute of dataset)
- A manuscript to be in ShareTrait must at least describe a dataset, and a manuscript may reference and describe multiple datasets (1,N)

Category Taxonomy

Category	Taxonomy
Definition	Resource containing information about the systematic classification of organisms

Table Name	Ref_Taxonomy		
Table Type	Entity		
Definition	The reference taxonomy classification		
Notes	For this version we define the taxonomic ranking complete list for facilitating the aggregation of data during the query (for example: (such as group by based on specific taxonomic levels. For future dev we will provide the ID url of the reference taxonomy.		
attribute_name	**type**	**definition**	**example**
taxonomy_pk	primary key, varchar(30)	PK of taxonomic name, **MANDATORY**	TRATAX001
scientific_name	varchar(256)	complete full scientific name of the taxonomic name, **MANDATORY**	Aphidius platensis Brethes, 1913
taxonomy_id_ref	ID	taxonomic id of the reference taxonomy. The taxonomy_id is then generic as the new attribute tax_db will contain ott db type. (ott = open tree of life), **OPTIONAL**	FD9T
taxonomy_db_name	varchar(256)	taxonomic db full name, (source), **MANDATORY**	Catalogue of Life
taxonomy_id_url	text	taxonomic db url mapping to the taxonomic name, **MANDATORY**	http://www.ichneumonoidea.name/local.php?taxonidLC=90216058
taxonomy_db_version	varchar(64)	taxonomy reference db version, **OPTIONAL**	2024-03-26
parent_id	ID	parent id of taxonomic name if exists, **OPTIONAL**	62D92
parent_name	text	Complete name of the parent of the scientific name, **OPTIONAL**	Aphidius
rank_level	varchar(128)	taxonomic level type of the scientific name, (taxo_level), **OPTIONAL**	species
phylum_name	varchar(128)	phylum of the scientific taxonomic name (phylum), **OPTIONAL**	Arthropoda
class_name	varchar(128)	class level of the scientific taxonomic name (class), **OPTIONAL**	Insecta
order_name	varchar(128)	order level of the scientific taxonomic name (order), **OPTIONAL**	Hymenoptera
family_name	varchar(128)	family level of the scientific taxonomic name (family), **OPTIONAL**	Braconidae

genus_name	varchar(128)	genus level of the scientific taxonomic name (genus), **OPTIONAL**	Aphidius
species_name	varchar(128)	Species level name (species), **OPTIONAL**	Aphidius platensis
common_names	text	common names used for the species, **OPTIONAL**	frog
comment_taxonomy	text	Any specific comments on the taxonomy naming (comments_taxonomy), **OPTIONAL**	Manually parsed the names from url

Table Name	taxonomic_label		
Table Type	Relation		
Definition	The reference taxonomic labelling mapped to the population observed		
attribute_name	**type**	**definition**	**example**
taxonomy_pk	primary key, varchar(30)	reference to Ref_Taxonomy (FK), **MANDATORY**	TRATAX001
population_pk	primary key, varchar(30)	reference to Population (FK), **MANDATORY**	TRAPOP001
name_date	date	ISO date used for taxonomic labelling, **MANDATORY**	2024-01-01
reference_source	varchar(64)	Reference label given to the taxa db, **MANDATORY**	COL
version_taxa	varchar(128)	version of the taxonomic mapping, **MANDATORY**	v1.0.0

Association Rules for the Category Taxonomy

Relationship Population - Taxonomy (through the Relation taxonomic_label)

- A population (group of individuals) can be identified with a species name by the researchers contributing to the study
- A population must be labelled with a scientific name and have an assigned official reference taxonomic name (1,1)
- A population may have multiple approved scientific names based on different reference resources (1,N)
- A taxonomic scientific name can be assigned to an population of individuals, but the same reference name can also be used to label many different individuals (0,N).

Category Environment

Category	Environment
Definition	Contextual information regarding the geographical site where a population occurs and has been observed

Table Name	Site		
Table Type	Entity		
Definition	The surface area condition where the population is observed in its natural habitat		
attribute_name	**type**	**definition**	**example**
site_pk	primary key, varchar(30)	PK of the site, **MANDATORY**	TRASIT001
site_name	primary key, varchar(30)	Name of the site, **OPTIONAL**	strawberry fields at the ARTIS
site_realm_general	varchar(256)	indicates where species inhabit (real_general), **OPTIONAL**	terrestrial
site_realm_specific	int	Specific details of the habitat (realm_specific), **OPTIONAL**	terrestrial
elevation_value	decimal(8,2)	Elevation value of the position where the population has being observed (elevation_of_collection), **OPTIONAL**	268
elevation_unit	varchar(30)	Standard unit of elevation value, **OPTIONAL**	meter
depth_value	decimal(8,2)	Depth value where the organism is being observed (depth_of_collection), **OPTIONAL**	0.3
depth_unit	varchar(30)	Standard unit of the depth value, **OPTIONAL**	meter
Table Name	occurrence		
Table Type	Relation		
Definition	The association to identify where a population occurs		
Notes	This table may not have the relation with Place directly as currently hardly any natural observation occurrence provides spatial information		
attribute_name	**type**	**definition**	**example**
population_pk	primary key, varchar(30)	reference (FK) to the population, **MANDATORY**	TRAIND001
site_pk	primary key, varchar(30)	reference to the site area, **MANDATORY**	TRASIT001
observation_date_i	date	The exact initial date of	20140501

nitial		population collection following the YYYYMMDD format (yyyymmdd_of_collection_initial), **MANDATORY**	
observation_date_final	date	The exact initial date of population collection following the YYYYMMDD format (yyyymmdd_of_collection_final), **OPTIONAL**	20140501
year_collection_initial	int	Initial year when the population is being collected (year_of_collection_inital), **OPTIONAL**	2014
year_collection_final		Final year when the population was collected (year_of_collection_final), **OPTIONAL**	20140501
comment_location	text	Some contextual free-text based on the point that the population is collected (comments_timing), **OPTIONAL**	Minutes of the longitude (long_mm) after asking for feedback to the submitting author
origin	varchar (128)	Defined term, Indicates the source where individuals were collected. (origin), **OPTIONAL**	field

Category Location

Category	Location		
Definition	Contextual information regarding the geographical site where a population occurs and has been observed		
Table Name	Place		
Table Type	Entity		
Definition	geographical name given to a surface area of the globe		
attribute_name	**type**	**definition**	**example**
place_pk	primary key, varchar(30)	primary key of place name, **MANDATORY**	TRAPLA001
place_name	TEXT	A place name of a location. For now there is no specification of what to provide for place_name. There is no controlled way yet to define this,	Rancagua

		OPTIONAL	
location_name	TEXT	Relevant notes about the location, mostly free text based based on the curator to keep track of the place where the individuals/population have been observed (comments_location), **OPTIONAL**	Lesina_Italy
location_label	varchar(256)	reference to know how the place name is provided. For now we provide two options {comment-based, term-based, gps-based} in which the location name/term is obtained from the spatial component if provided, **OPTIONAL**	comment-based
country_name	varchar(256)	The country where the place is located, **MANDATORY**	Chile
continent_name	varchar(256)	A geographical collection of countries known as main continent, **MANDATORY**	South America
geoname_countryid	varchar(256)	the geonames id reference that maps to the place name (ideally should be required to be provided in url), **MANDATORY**	3895114

Table Name	located_in		
Table Type	Relation		
Definition	The association of a an area of interest with the reference geographical political naming system		
Comment	We have decided to define a site on its own such that it can be extended to provide more contextual information about the physical habitat, as for now with a few metadata fields. Location gps positions is a choice to provide only between Site and Place as this depends on the relationship between population and site. A population can have different site observations, thus different		
attribute_name	**type**	**definition**	**example**
site_pk	primary key, varchar(30)	reference (FK) to the site, **MANDATORY**	TRASIT001
place_pk	primary key, varchar(30)	reference (FP) of the place, **MANDATORY**	TRAPLA001
latitude	DECIMAL(8,2)	Latitude value, in decimal degrees (lat_decimal), **MANDATORY**	51.15530556
longitude	DECIMAL(8,2)	Longitude value of the	4.398777778

		position of the site, in decimal degrees (long_decimal), **MANDATORY**	
comment_location	text	Relevant notes about the location (location_description), **OPTIONAL**	various spots in Southeast Queensland_Australia
location_check	text	check if the term used for location maps back to the reference term obtained from the dataset (mapping to location_name), **OPTIONAL**	Southeast Queensland_Australia

Category Organism

Category	Organism		
Definition	Primary Relevant source of information regarding the individual species that is being collected and described based on a condition and/or during a study of interest. Characteristics based on individuals are measured and these consist of morphological features and functionalities.		
Table Name	Population		
Table Type	Entity		
Definition	Information about the group of individuals sharing the same characteristics and located in the same place		
Notes	The ShareTrait dataset does not currently contain a defined set of population, it refers to species reported record		
attribute_name	**type**	**definition**	**example**
population_pk	primary key, varchar(30)	Defines if population reference provides measurements that are derived from a collection rather than individuals, **MANDATORY**	TRAPOP001
population_name	varchar(256)	Reference to dataset naming or identifiers of the collection/population, **OPTIONAL**	popid1
population_label	varchar(30)	Defines if population reference provides measurements that are derived from a collection rather than individuals, **MANDATORY**	ind_measure/pop_measure
population_description	text	free text based characteristics worth to mention about the specific	A very big population, only decided to take a few

		population, **OPTIONAL**	
species_reported	varchar(256)	species name given based on the study (species_reported), **MANDATORY**	aphidius_platensis
authority	text	comment containing year and name noted to the species (authority), **OPTIONAL**	rare
population_facts	text	Any relevant information specific for population if mentioned by author/article, **OPTIONAL**	Different populations of Aphidius platensis
comments	text	any relevant remarks regarding the species described, **OPTIONAL**	Species verified by multiple collectors

Table Name	describe		
Table Type	Relation		
Definition	The reference of the dataset to a population observed and described for a study		
attribute_name	**type**	**definition**	**example**
dataset_pk	primary key, varchar(30)	Reference to Dataset entity (foreign key), **MANDATORY**	TRADAT001
population_pk	primary key, varchar(30)	Reference to Population entity. This ID is generated (foreign key), **MANDATORY**	TRAPOP001
date_describe	text	Date when a population is described	19 July 2018
date_iso	date	Standard ISO date	2018-07-18
year	int	Standard ISO year	2018

Table Name	Individual
Table Type	Entity
Definition	Information about the physical individual observed and collected for the conduction of the study and the description of the trait.
Notes	The information provided in this entity belongs to the condition of the individual at the moment that has been collected. For example, age of individual is based on the moment of collection, but age can be also an attribute of experiment condition, in which an individual has a certain age when it was mated. At the moment, certain characteristics which we are not aware of the evolution are fixed descriptors for an individual. These are: age, sex, parent and offspring, mating related information. For example, at the moment, all parent info will be stored under individual as we are not able to trace which are the parents of the individuals

attribute_name	type	definition	example
individual_pk	primary key, varchar(30)	PK of the individual, **MANDATORY**	TRAIN000001
individual_id	varchar(64)	An individual id for identifying subgroups or id provided to the specimen, this can be associated to a dataset reference for example., **OPTIONAL**	INDDAT1
representative_stage	varchar(256)	The current life stage if identified when an individual is being observed. Specify if it is a egg, larvae, adult stage when individual is collected, **MANDATORY**	adult
sex	varchar(64)	Sex type of individual as indicated in the study when the individual is being observed. (sex), **OPTIONAL**	female
individual_type	varchar(64)	indicates if it is part of offspring generation or parent type. Used to controll the parenthood relationships, **OPTIONAL**	parent
individual_parentpk	ID	specification if the specimen has a related specimen in the collection, such as parent is known. If parent is unknown, then leave blank, **OPTIONAL**	TRAIND001
individual_parentid	ID	ID of a parent as specified in the reference study or dataset, **OPTIONAL**	mom54
parental_size_value	DECIMAL(8,2)	Current size of the parent individual when collected (parental_size_value), **OPTIONAL**	9.1
parental_size_unit	varchar(64)	Standard unit of measurement for the size metric of the parent individual collected (parental_size_units), **MANDATORY IF parent_size_value provided**	millimeter
parental_size_type	varchar(64)	Type of size metric of the parent (parental_size_type), **OPTIONAL**	Fresh body mass
parent_age	INT	age of the parent (parental_age), **OPTIONAL**	1
parent_unit_age	varchar(64)	units used to define the age of the parent (parental_age_units), **MANDATORY IF parent_age provided**	year

mating_method	VARCHAR (256)	Indicates whether mating was allowed or not during the acclimation period, (mating), **OPTIONAL**	yes
method_type	VARCHAR (256)	Indicates the method used to estimate the fecundity, (method_type), **OPTIONAL**	counting
offspring_developmental_stage	VARCHAR (256)	Indicates the category for each developmental stage, (offspring_developmental_stage), **OPTIONAL**	egg stage I
offspring_size_type	VARCHAR (256)	Type of size metric of the offspring, (offspring_size_type), **OPTIONAL**	egg volume
offspring_size_units	VARCHAR (256)	Unit of size metric of the offspring, (parental_size_units), **OPTIONAL**	milligram
offspring_size_value	DECIMAL (8,2)	Size value of the offspring, (parental_size_value), **OPTIONAL**	1.00E-04
strategy_of_protection	TEXT	Indicates whether eggs are protected or not after laying, (strategy_of_protection), **OPTIONAL**	protected (carried by the female, or attached to a substrate or floating in clumped masses)
description_individual	TEXT	free description and remarks relevant to the individual as provided in the dataset, **OPTIONAL**	the individual is really cute
comment	TEXT	Any extra comments that are not mentioned in the study, **OPTIONAL**	weak individual, handle with care

Table Name	contains
Table Type	Relation

Definition	The reference of the population to its individuals		
attribute_name	**type**	**definition**	**example**
population_pk	primary key, varchar(30)	Reference to Population entity. This ID is generated (foreign key), **MANDATORY**	TRAPOP001
individual_pk	primary key, varchar(30)	Reference to Individual entity. This ID is generated (foreign key), **MANDATORY**	TRAIND000001
Table Name	Trait		
Table Type	Entity		
Definition	*Traits* are characteristics or attributes of an organism that are expressed by genes and/or influenced by the environment. Traits include physical attributes of an organism such as hair colour, leaf shape, size, etc., and behavioural characteristics, such as bird nesting. (ref:https://www.biologyonline.com/dictionary/traits#)		
attribute_name	**type**	**definition**	**example**
trait_pk	primary key, varchar(30)	PK of the sharetrait trait, **MANDATORY**	TRATRA001
trait_name	varchar(256)	This will be a defined trait, **MANDATORY**	development time
trait_id	ID, varchar(30)	trait db identifier given to the trait, **OPTIONAL**	DEVTIME
sharetrait_type	varchar(256)	reference trait term used for sharetrait dataset (trait_name), **MANDATORY**	metabolic_rate
trait_type	varchar(64)	this will include what category the trait refers to. At the moment we have only functional, but it can be morphological, behavioural.. **MANDATORY**	functional
trait_condition	text	Functional expression used for defining the trait, used for reducing ambiguous interpretation of sharetrait definition of the trait measurement, **MANDATORY**	Frequently measured as rate of oxygen uptake or rate of CO2 production.
trait_parentid	ID	parent id of trait, especially for subcategory traits defined, **OPTIONAL**	DEVTIME
life_stage_general_initial	varchar(64)	Life stage term used for a state of phase that can be specific for trait (life_general_stage_initial), **OPTIONAL**	egg
life_stage_general_final	varchar(64)	End stage term if defined for a phase (life_general_stage_final), **OPTIONAL**	adult

trait_definition	text	Full trait definition to explain the term of the trait, **OPTIONAL**	amount if energy expended per time unit
trait_definition_source	varchar(256)	Source (provide full name) of expert or citation for definition, **MANDATORY**	wilco
trait_unit	varchar(64)	Preferred standard unit for the trait, **OPTIONAL**	mLO2/h/ind
trait_comment	text	free text comment which contains more specific reference and resources based for the trait defined. **OPTIONAL**	check new reference paper, or url for definition of this trait
Table Name	Measurement		
Table Type	Relation		
Definition	A measurement is any measurable or observable characteristic of an organism. It is a quantitative sharetrait characteristic that is measured for an individual / population. A measurement is obligatory to exist for it to be part of sharetrait.		
attribute_name	**type**	**definition**	**example**
measurement_pk	primary key, varchar(30)	PK of the measurement relation table, **MANDATORY**	TRAMEA000001
individual_pk	primary key, varchar(30)	Reference to Individual entity. This ID is generated (foreign key), **MANDATORY MANDATORY**	TRAIND000001
trait_pk	primary key, varchar(30)	Reference to trait entity. This ID is generated (foreign key), **MANDATORY**	TRATRA001
trait_value	DECIMAL(8,4)	Measured value of the sharetrait trait (trait_value), **MANDATORY**	96
trait_type	varchar(64)	Generic measure check type for trait name to make reference to sharetrait dataset trait name. For now the possible types are {development, fecundity, metabolic_rate}, **MANDATORY**	fecundity
trait_unit	varchar(64)	Unit of measurement used for the trait (trait_unit), **MANDATORY**	offspring number
trait_error_estimate	DECIMAL(8,4)	Error associated with trait estimate, (trait_error_estimate), **OPTIONAL**	no example so far
trait_error_type	VARCHAR (30)	Type of metric used to estimate error of the trait, (trait_error_type), **OPTIONAL**	no example so far
trait_converted	TEXT	trait measurement value that is converted for standardisation and data integration purposes (trait_converted), **OPTIONAL**	0.07570059152
individual_developmental_stage	VARCHAR (30)	indicates the category for each developmental stage, **OPTIONAL**	embryo

fresh_mass	DECIMAL (8,2)	fresh body mass of individual, (fresh_mass), **OPTIONAL**	no example so far
fresh_mass_unit	VARCHAR (30)	standard unit used for the fresh body mass of the individual, **OPTIONAL**	no example so far
sample_size	VARCHAR (30)	Number of individuals tested for trait estimate, (sample_size), **OPTIONAL**	no example so far
size_condition	VARCHAR (30)	specification for the measurement size of the individual when the trait measurement is taken. **OPTIONAL**	no example so far
size_value_initial	DECIMAL (8,2)	Size value at the start of the development stage of the individual. Specific for the developmental trait measurement, (size_value_initial), **OPTIONAL**	no example so far
size_value_final	DECIMAL (8,2)	Size value at the final of the development stage of the individual. Specific for developmental trait, (size_value_final), **OPTIONAL**	85
size_value	DECIMAL (8,2)	Size value of the individual, (size_value), **MANDATORY**	236
size_units	VARCHAR (30)	Unit of size metric, (size_units), **MANDATORY**	milligram
size_type	VARCHAR (30)	Type of size metric, (size_type), **MANDATORY**	tibia size
life_stage_general	VARCHAR (256)	life stage used during the experiment as defined by the researcher in the paper (life_stage_general), **OPTIONAL**	adult
life_stage_specific	VARCHAR (256)	specific life stage used during the experiment as defined by the researcher in the paper, (life_stage_specific), **OPTIONAL**	"98 dpf"
lifestage_specific_initial	VARCHAR (256)	Specific initial life stage used at the start of the trial as defined by the researcher in the paper. (life_stage_specific_initial), **OPTIONAL**	Gosner stage 25
lifestage_specific_final	VARCHAR (256)	Specific life stage used at the end of the trial as defined by the researcher in the paper. (life_stage_specific_final), **OPTIONAL**	Gosner stage 26
comment_trait	TEXT	comment and relevant notes regarding the trait measurement as defined by the researcher, (comments_trait), **OPTIONAL**	Observed development stage: 20; MotherID: 326_2020
measure_date	TEXT	standard date when the measurement is being calculated. **MANDATORY**	2023-07-21
fecundity_temporal_unit	TEXT	Indicates the temporal scale does the fecundity unit encompass, (fecundity_temporal_unit), **OPTIONAL**	early fecundity (5 to 12 days old)
reproductive_stage	TEXT	Indicates the reproductive stage of individuals as defined by the researcher in the paper, (reproductive_stage), **OPTIONAL**	virgin
experiment_location	TEXT	Indicates where the experiment to determine the fecundity was carried out, (experiment_condition), **OPTIONAL**	laboratory

comments_experimental_condition	TEXT	Relevant notes about the experimental conditions, (comments_experimental_condition), **OPTIONAL**	Larvae exposed to dinitrophenol conditions and low food level. Larvae from the low food level received the same amount of Artemia three times a week, and in the fil instar additiolly were fed one chironomid three times a week

Category Method

Category	Method		
Definition	The controlled conditions applied to individuals in order to measure specific trait		
Table Name	Condition		
Table Type	Entity		
Definition	Primary relevant information of the laboratory controlled condition prior to the trait measurement taken		
Comment	The type of condition is specified for the experimental_setup. At the moment, the possible types of conditions are referred to test, acclimation or maintenance and these conditions all share the same metadata types (for example oxygen value)		
attribute_name	**type**	**definition**	**example**
condition_pk	primary key, varchar(30)	Primary Key of condition entity, **MANDATORY**	TRACON001
temperature	decimal (8,2)	Temperature value of the condition (maintenance_temperature, acclimation_temperature, test_temperature), **OPTIONAL**	10
photoperiod	TEXT	photoperiod schedule of daylight and night hours, (maintenance_photoperiod, acclimation_photoperiod, test_photoperiod), **OPTIONAL**	14L_10D
humidity	DECIMAL (8,2)	humidity level measured during the condition, (maintenance_humidity, acclimation_humidity, test_humidity), **OPTIONAL**	100
oxygen	DECIMAL (8,2)	oxygen level measured during the condition, (maintenance_oxygen, acclimation_oxygen, test_oxygen), **OPTIONAL**	21

carbon_dioxide	DECIMAL (8,2)	carbon dioxide level measured during the condition, (maintenance_carbon_dioxide, acclimation_carbon_dioxide, test_carbon_dioxide), **OPTIONAL**	400
salinity	DECIMAL (8,2)	salinity level, (maintenance_salinity, acclimation_salinity, test_salinity), **OPTIONAL**	21
pH	DECIMAL (8,2)	pH value of the condition, (maintenance_ph, acclimation_ph, test_ph), **OPTIONAL**	7.6
oxygen_units	VARCHAR (30)	Units used to express the oxygen during the condition, (maintenance_oxygen_units, acclimation_oxygen_units, test_oxygen_units), **OPTIONAL**	kPa
carbon_dioxide_units	VARCHAR (30)	Units used to express the oxygen during the condition, (maintenance_carbon_dioxide_units, acclimation_carbon_dioxide_units, test_carbon_dioxide_units), **OPTIONAL**	ppm
food_type	TEXT	Food type or description of the food used during the experiment, (maintenance_food_type, acclimation_food_type, test_food_type), **OPTIONAL**	Honey
duration	INT	duration period in days of the condition, (maintenance_duration_days, acclimation_duration), **OPTIONAL**	126
duration_generations	TEXT	number of generations during condition, (maintenance_duration_generations) , **OPTIONAL**	1.0
method_check	TEXT	db specific metadata to check what type of condition label we are referring to. This is to double check the origin of the experimental_setup type, (maintained, acclimated), **OPTIONAL**	test

Table Name	experiment_setup		
Table Type	join		
Definition	Relation of the (experimental) condition metadata and specifications to a measured trait		
attribute_name	**type**	**definition**	**example**
measurement_pk	primary key, varchar(30)	PK of the measure, **MANDATORY**	TRAMEA001

condition_pk	primary key, varchar(30)	PK of the condition entity, **MANDATORY**	TRACON001
condition_label	varchar(256)	Condition is either test, maintenance, acclimation, **MANDATORY**	test
setup_date	date	ISO date when an experiment condition is setup, **MANDATORY**	2023-06-06
experiment_location	TEXT	Indicates where the experiment to determine the fecundity was carried out, (experiment_location), **OPTIONAL**	no example so far
Table Name	Acclimation_describe		
Table Type	Relation		
Definition	Association of a condition to acclimation specifications which are only relevant for condition=acclimation.		
Notes	Extension of attributes for condition is acclimation		
attribute_name	**type**	**definition**	**example**
condition_pk	primary key, varchar(30)	Reference to Condition entity (foreign key)	TRACON000001
acclimation_pk	primary key, varchar(30)	Reference to Acclimation_specification (foreign key)	TRAACC001
specification_date	date	ISO date linked to acclimation specification	07-07-2023
Table Name	Acclimation_specification		
Table Type	Entity		
Definition	Extension specifications for acclimation		
Notes			
attribute_name	**type**	**definition**	**example**
acclimation_pk	primary key, varchar(30)	Primary key of acclimation specifications, **OPTIONAL**	TRAACC000001
acclimation_mating	varchar (256)	Indicates whether mating was allowed or not during the acclimation period (mating), **OPTIONAL**	yes
acclimation_chamber	TEXT	Provide acclimation time after transfer to respirometry chamber, (acclimation_chamber), **OPTIONAL**	1

fasting_time	varchar(30)	Provide duration of animal fasting before placement in respirometry chamber, (fasting_time), **OPTIONAL**	4
fasting_unit	varchar(30)	Standard unit of fasting time, **OPTIONAL**	hours

Table Name	chamber_describe		
Table Type	join		
Definition	Specifications regarding the chamber used for specific trait measurements		
Notes			
attribute_name	**type**	**definition**	**example**
measurement_pk	primary key, varchar(30)	reference key to measurement (FK), **OPTIONAL**	TRAMEA001
technique_pk	primary key, varchar(30)	reference to technique_pk (FK), **OPTIONAL**	TRATEC001
specification_date	date	Specific date of chamber setup, **OPTIONAL**	04-04-2024

Table Name	respiratory_chamber		
Table Type	entity		
Definition	Chamber characteristics and setup used for certain trait measurements		
Notes	These are optional and only specific if a specific trait is measured, for this reason, even the respiratory chamber key is optional and can only be generated if there is one measurement value for the type that deals with respiratory sensors		
attribute_name	**type**	**definition**	**example**
technique_pk	primary key, varchar(30)	Primary key of respiratory_chamber, **OPTIONAL**	TRATEC001
sensor_type	TEXT	Sensor type used to measure the oxygen during the experiment (sensor_type), **OPTIONAL**	fiber optic-based oxygen analyzer
respiration_volume	DECIMAL (8,2)	Volume of the empty respirometric chamber (respiration_volume), **OPTIONAL**	5000
delay_time	varchar(256)	Provide wait (delay) time excluded from closed measurement cycles. Also referred as equilibration period. (delay_time), **OPTIONAL**	0.3

respiratory_chamber_material	varchar(256)	Material of respirometer, (respiratory_chamber_material), **OPTIONAL**	plastic
incubation_time	decimal (8,2)	Time spend in the respirometry chamber (incubation_time), **OPTIONAL**	6
respirometry_type	VARCHAR (256)	Type of respirometry as defined by the researcher in the paper (respirometry_type), **OPTIONAL**	closed
breathing_mode	VARCHAR (256)	Breathing mode based on the respiratory medium used in the experiment (breathing_mode), **OPTIONAL**	aquatic
metabolic_rate_type	VARCHAR (256)	Type of respirometry type as defined by the researcher in the paper (metabolic_rate_type), **OPTIONAL**	standard