

Weed Traits Database (WTDB) Requirements

The outline of this document copies the *XML Query (XQuery) Requirements* document (www.w3.org/TR/xquery-requirements/).

Version: 19 August 2008.

Abstract

The Weed Traits Database (WTDB) is an open database residing on Internet. It provides information about weed traits and parameters for the species most important to European agriculture. WTDB is managed by the ENDURE RA4.5 Working Group but is open for research purposes for the whole scientific community. WTDB has a well-defined software interface that facilitates smooth operation with other software, such as weed simulation models.

1. Goals

The goal of the ENDURE RA4.5 Working Group is to develop WTDB through the phases of design, implementation and filling in of data for an initial 20 species. To enhance the use of WTDB by simulation models, it will contain information on both weed traits and weed model parameters. With WTDB we aim to support a community ecology perspective in weed research and to enhance collaboration between weed and plant ecologists.

2. Usage Scenarios

The following usage scenarios describe how WTDB may be used in various environments, and represent a wide range of activities and needs that are representative of the problem space to be addressed. They are intended to be used as design cases during the development of WTDB, and should be reviewed when critical decisions are made.

2.1 STATISTICAL ANALYSIS

Carry out statistical analyses to explore the relationships between weed traits, or to analyse long-term field experiments.

2.2 FUNCTIONAL GROUPS

Identify functional groups and typical species of each group.

2.3 INDICATOR TRAITS

Identify indicator traits, i.e. traits that are good indicators to which functional group a species belongs.

2.4 SIMULATION MODELLING

Access WTDB from a simulation model to look up values for traits and parameters.

2.5 EXPERIMENTAL DESIGN

Standardise experimental design by rational selection of weed species for experimentation.

2.6 RESEARCH PLANNING

Identify gaps in knowledge about weed traits and model parameters to aid rational planning of research activities.

2.7 IDEA GENERATION

Inspire to new scientific perspectives on weed ecology.

2.8 SCIENTIFIC PUBLICATIONS

Serve as a basis for scientific publications.

2.9 PUBLIC USAGE

Used by researchers outside the ENDURE RA4.5 Working Group.

2.10 TEACHING

Possible student exercises: How would you control these weeds in this field? Find correlations between traits, combine with multivariate analysis.

3 Requirements

3.1 Terminology

The following key words are used throughout the document to specify the extent to which an item is a requirement for WTDB:

- ‘must’ means that the item is an absolute requirement;
- ‘should’ means that there may exist valid reasons not to treat this item as a requirement, but the full implications should be understood and the case carefully weighed before discarding this item;
- ‘may’ means that an item deserves attention, but further study is needed to determine whether the item should be treated as a requirement.

3.2 General Requirements

WTDB must include traits to describe both annual and perennial weed species.

WTDB must be implemented in standard, widely-used database software.

WTDB should not contain the raw data but statistical summaries thereof.

WTDB must reside on the Internet, possibly on an AU server, or maybe INRA.

WTDB may include how management procedures affect traits.

3.3 WTDB Data Model

WTDB must contain metadata to facilitate interpretation of the data.

3.4 WTDB Functionality

WTDB must have a simple web interface.

WTDB should be accessible through Virtual Lab.

3.5 WTDB Contents

WTDB should initially focus on 20 weed species deemed important by the ENDURE RA4.5 Working Group.

To make WTDB as widely applicable as possible, we must consider different growing systems, including organic vs. herbicide-based agriculture, and select a wide range of weeds of importance to different crops (cereals, maize, oilseed rape, beet, potato, soybean, vegetable row crops).