SLOVENSKI STANDARD
SIST EN 16164:2013

01-julij-2013

Kakovost vode - Navodilo za načrtovanje in izbiro taksonomskih ključev

Water quality - Guidance standard for designing and selecting taxonomic keys

Wasserbeschaffenheit - Anleitung zur Gestaltung und Auswahl von taxonomischen Bestimmungsschlüsseln

Qualité de l'eau - Guide pour la conception et le choix des clés taxonomiques

Ta slovenski standard je istoveten z: **EN 16164:2013**

ICS:

13.060.01	Kakovost vode na splošno	Water quality in general

SIST EN 16164:2013 en,fr,de

iTeh STANDARD PREVIEW
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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 16164

January 2013

ICS 13.060.99

English Version

Water quality - Guidance standard for designing and selecting taxonomic keys

Qualité de l'eau - Guide pour la conception et le choix des clés taxonomiques

Wasserbeschaffenheit - Anleitung zur Gestaltung und Auswahl von taxonomischen Bestimmungsschlüsseln

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COMITÉ EUROPÉEN DE NORMALISATION
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Ref. No. EN 16164:2013: E

EN 16164:2013 (E)

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Foreword

This document (EN 16164:2013) has been prepared by Technical Committee CEN/TC 230 "Water analysis", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by July 2013, and conflicting national standards shall be withdrawn at the latest by July 2013.

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Introduction

The importance of ecology in new legislation such as the EC Water Framework Directive (2000/60/EC) means, that ecological data from aquatic environments shall be of a known and verifiable quality. European Standards recognise the need for ecologists to use reliable and up-to-date taxonomic keys when performing their assessments. However, determining the most appropriate literature to use for any particular analysis is not always straightforward. This guidance standard is designed to provide an overview of the characteristics of a taxonomic key appropriate to applied ecological analyses. This has two goals: first, to help end-users to determine the most suitable taxonomic literature to use for a particular analysis and, second, to help those commissioning new identification guides to produce 'fit-for-purpose' specifications, and those writing keys to meet such specifications.

It is important to state very clearly at the outset that the role of this document is not to replace but rather to complement the guidance on nomenclature and taxonomy given by ICBN [3] and ICZN [4].

Identification materials are increasingly being presented using electronic, rather than conventional printed, media. The general principles are the same, regardless of the media.

1   Scope

This European Standard defines standard principles for the design of taxonomic keys to ensure proper use of nomenclatural rules and reproducible and traceable identification. These principles also allow for the selection of the best key available.

2   Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1
accuracy
correct identification of a specimen to the relevant taxonomic category (e.g. family, genus, species)

Note 1 to entry: The definition refers to the context of this European Standard.

2.2
International Code of Botanical Nomenclature
ICBN
official international taxonomic code for botany

2.3
International Code of Zoological Nomenclature
ICZN
official international taxonomic code for zoology

2.4
nomenclatural rules
rules for naming of organisms that are laid down in official taxonomic codes

2.5
traceable identification
identification of a taxon which can be traced back to its original publication either directly or indirectly

3   Principles of biological identification

The objective of all biological identification is to assign the correct biological name to a specimen, irrespective of the amount of morphological or other variability shown by the taxon in question. This should be done as efficiently as possible, in order to minimise time and resources. Identification provides a link between a specimen of an organism and the original 'type specimen' of that taxon. This is often one or more individuals of the species, preserved in a museum collection (or, in the case of many algae, an illustration), which has been described according to the rules of the ICBN or ICZN using text, measurements and illustrations.

There are two methods of identifying organisms: by 'matching' (pattern recognition) and by 'logical comparison' (typically through the use of keys). The academic taxonomic literature often assumes that logical reasoning is used exclusively but, in practice, most biologists use a combination of approaches: relying on memory for naming common organisms and a mix of pattern recognition and logical reasoning for the less common organisms. It is arguably the poor quality of identification literature that causes biologists to switch from logical reasoning to pattern recognition.

4   Requirements for taxonomic keys

4.1   General principles

Most identification guides assume that logical comparison plays a large part in the identification of organisms, and the guides have a key, or similar device, at their core. These work by presenting users with a limited number of choices from which to choose either in sequence ('dichotomous keys') or in parallel ('multiaccess keys'). The same principles apply, regardless of the type of key.

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Taxonomic keys are used to come to an accurate and reproducible identification. Within this context, 'accurate' is defined as the correct identification of all specimens of a taxonomic group likely to be encountered in a defined geographical region. Therefore, any lack of clarity which may lead to mis-identification should be anticipated at all taxonomic levels.

Requirements for an appropriate identification guide include:

— keys appropriate to the geographic area under consideration;

— appropriate taxonomic level for the analysis in question;

— all known taxa from the region;

— written in a language familiar to the analyst.

The key itself should provide:

— a clearly defined title and scope (completeness of taxonomic group);

— robust characters;

— clear layout;

— clear language;

— complete glossary.

The points mentioned above are especially relevant since academic taxonomists often write from the perspective of an 'expert' and do not always empathise with the skills of those performing the analyses.

These points are described in more detail below.

4.2   Title and scope

An identification guide should be clear about the taxonomic groups and life stages covered, and the geographical scope of the guide. These should be reflected both in the title and, in more detail, in the introduction.

EXAMPLE 1   Titles like "Chironomidae larvae of the Lowlands of Northwesttern Europe", "Oligochaeta of North-West Europe" and "Chironomidae exuviae of the West Palaearctic Region" suggest a defined overview of the content. However, a number of terms within each title would need amplification in the introduction. Terms such as 'lowlands' would need to be explained in more detail, whilst maps and text showing the limits of the author's understanding of 'North-West Europe' and 'West Palaearctic' would also be useful.

On the other hand, it is often inappropriate to define the geographical scope too precisely; firstly, because the geographical ranges of many species are themselves known only imprecisely and secondly, because the ranges of many species are changing.

EXAMPLE 2   Two species of the Trichopertan genus *Drusus* have been recorded from the Netherlands: *D. trifidus* and *D. annulatus*. A third species, *D. biguttatus* is similar to *D. annulatus* and has been recorded from sites close to the Dutch border, though not yet from within the Netherlands. A Dutch Trichopteran key which made no reference at all to *D. biguttatus* runs the risk of users 'shoehorning' specimens into *D. annulatus*.

A similar situation exists for the Mollusc genus *Corbicula* in Britain and Ireland. *C. fluminea* is described in "Freshwater Bivalves of Britain and Ireland"; however, *C. fluminalis* has not yet been recorded from Britain and Ireland and is omitted. Users may not realise that *C. fluminalis* is spreading throughout Europe and may, in time, also spread to Britain and Ireland.

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For this reason, authors should always produce an accurate description of the geographical region primarily covered by the key and illustrate it by a detailed map. In addition, all species recorded from the region should be mentioned in the key. Relevant species known from adjacent regions should be explicitly listed. If data are absent this should also be clearly mentioned.

4.3 Characters

Choosing the best characters:

— How easy are they to describe?

— Are they appropriate for the potential users?

— Are they very fragile or easily damaged?

— Are they sex specific?

— Are they restricted or limited to particular regions?

— Are they restricted to particular seasons?

— Are they adult or juvenile?

Use obvious characters even if they do not differentiate all specimens or do not define the taxon (e.g. habitat, markings, size). The use of characters requiring very high magnification or special preparations should be avoided where possible, and included only as a last resort. If such characters are essential then this should be mentioned as part of the description.

4.4 Layout

The layout of the key should guarantee easy routing through the identification couplets enabling accurate identification in the minimum time. Layout comprises both typography and graphics.

4.5 Description of Morphology

4.5.1 Couplets

4.5.1.1 As far as possible, couplets in a dichotomous key (or choices in a multi-access key) should be discrete and categorical in nature. Common and obvious taxa should be differentiated early in the key. Couplets should be simple and focus on those aspects of a taxon's morphology that best distinguish it from similar taxa.

The number of features which are not relevant should be limited. Avoid geographical and ecological characters within the body of the key itself as far as possible (although such information may, occasionally, be useful: for example, if all the taxa in one couplet are all endo-parasites and those in the other are free living).

As far as possible, each choice within a couplet should be based on positive attributes of the taxa in question and it is especially important to give clear guidance when the absence of a character is used to differentiate between taxa.

The presence of an adipose fin, for example, is a useful means of recognising a Salmonid fish. However, the absence of an adipose fin is only a useful taxonomic character of a non-Salmonid fish if the key contains a clear description (ideally alongside the couplet) showing what an adipose looks like and where, on the fish, it can be found, so that the user can be sure that s/he has recorded a genuine 'absence'.

It is useful to have illustrations of critical characteristics.