
**Stored cereal grains and pulses —
Guidance on the detection of infestation
by live invertebrates by trapping**

*Céréales en grains et légumineuses stockées — Lignes directrices pour
la détection de l'infestation par des invertébrés vivants par piégeage*



PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

© ISO 2004

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Terms and definitions	1
3 Principle	2
4 General	2
5 Trap types	3
6 Method of trapping	3
6.1 Trapping in bulk grain	3
6.2 Trapping in sack stores	4
7 Record of findings	6
8 Interpretation of findings	7
Annex A (informative) Other methods for the detection of live invertebrates in stored grain	8
Annex B (informative) Examples of trap types for detecting live invertebrate infestation in stored grain	9
Annex C (informative) Illustrations of examples of the different trap types used for the detection of live insects and mites in stored grain	10
Annex D (informative) Examples of treatment methods for grains infested by invertebrate pests	13
Bibliography	14

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 16002 was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 4, *Cereals and pulses*.

Introduction

Within the food sector, cereal grains are the commodities which are traded in the greatest quantities. They often form nations' strategic food reserves. They can be stored for varying periods and under differing conditions, and are always susceptible to invertebrate infestation. The risk of infestation varies with the storage methods used, with time, and with the ambient temperature and humidity in the storage area. Even short storage periods in the tropics can result in the development of significantly damaging infestations.

If cereal grains become infested, the consequences can be damage, loss of quality, loss of value, and deterioration of nutritional value, and can lead to illness in animals and humans.

Infested cereal grains can act as a reservoir for the subsequent infestation of sound cereal grains. Infestation can lead to rejection of deliveries, contractual problems, loss of international trade and reputation, and problems with phytosanitary certification under the International Plant Health Convention.

Effective detection of infestation enables informed decisions to be made about if and how cereal grains require remedial treatment. Such treatments, examples of which are given in Annex D, may have implications for the subsequent use of such cereal grains in products destined for animal and human consumption.

Many methods may be used for the detection of live invertebrate infestation in stored grains, but it is considered that the most satisfactory systems for their detection in stored cereal grains and pulses are based on trapping, as described in this International Standard. Some of the other methods are listed in Annex A. These various methods have their own advantages and disadvantages. Methods based on the removal and subsequent assessment of samples are inherently less suitable for insect detection due to the sampling method.

Trapping for invertebrates in the storage of cereal grains and pulses can be used to detect the existence of pests, to collect specimens for accurate identification, to assess their numbers if action thresholds have been set, and to monitor invertebrate populations after the application of control measures to test their effectiveness.

The standard method (ISO 13690) for the sampling of cereal grains and pulses specifically does not apply to sampling for the detection of infestation. There are standard methods for the detection of hidden infestation [see ISO 6639 (all parts)] but no other International Standard exists for the detection of live invertebrates moving freely within cereal grains and pulses stored in bulk or in bags.

1

Stored cereal grains and pulses — Guidance on the detection of infestation by live invertebrates by trapping

WARNING — The placement of traps within bulk grain stores will involve access to the grain surface. It is important that operator safety is considered. Access into closed storage silos may be hazardous and due assessment must be made of the risks involved, including entry and exit procedures and the possibility of the presence of noxious gases.

For these reasons, this standard is most applicable to grain which is stored in bulk in open bins and silos, and in flat or floor stores and in sack stores.

1 Scope

This International Standard describes methods for the detection by trapping of live invertebrates in cereal grains and pulses stored in bags or in bulk.

2 Terms and definitions

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

2.1

grains

cereal grains and/or pulses

2.2

beetles

species (members) of order *Coleoptera*

NOTE Many weevils within the coleopteran family Curculionidae are highly significant pests of stored cereals, being “hidden infestations” for much of their life cycles. Several other coleopteran families include important grain damaging species.

2.3

infestation

live insect and mite species which, during some stage(s) of their life cycle, are capable of causing damage to the grain

NOTE These are also known as “pest species”.

2.4

invertebrates

multicellular animals without spinal column, with special reference to insect and mite species within the phylum *Arthropoda*

2.5

moths

species of the order *Lepidoptera* (*Heterocera*), which are less brightly coloured than butterflies and fly mainly at night

NOTE Butterflies (*Rhopalocera*) and moths (*Heterocera*) belong to the same order *Lepidoptera*, but butterflies are not encountered in grain storage.