

THE IMPORTANCE OF SYMPATHY BETWEEN TECHNICAL ASPECTS  
OF CONTROL PROGRAMMES AND INDUSTRIAL CIRCUMSTANCES

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**INTRODUCTION:** Integrated control has been defined as an ecological approach to pest control based on studies of the life systems of the pests and the ecosystems of which they are part. Man is obviously part of any macro-ecosystem which includes an insect species classified as a stored-product pest; therefore, if control of such a pest is indeed necessary for man's well-being, then it must follow that technical aspects of the control programme must be sympathetic, in a very wide sense, to a number of industrial, social and economic considerations. This is obviously necessary for health and environmental reasons - it is no less necessary to the adoption and implementation of technical measures which are proposed: it is the aim of this paper to examine the latter, less emotive, but vitally important consideration.

**INERTIA TO PROGRESS:** Stored-product technologists can provide technically sound, comprehensive solutions to insect problems, but, in spite of substantial understanding in government circles and in many industries regarding the desirability of controlling the pests, acceptance of recommended corrective action is often slow or incomplete. Even the well publicised awareness and concern of international authorities relating to the importance of effective protection of stored products, particularly staple foods, against quantitative or qualitative deterioration does not always stimulate the necessary response.

There are fairly obvious reasons for such inertia and these have been widely recognized by storage technologists, particularly by those who work at the interface between science and commerce. In view of the importance of this impediment to adoption and comprehensive application of the results of storage studies, it is somewhat remarkable that little progress appears to have been made in the development of extension methodology sympathetic to the idiosyncracies of the task.

Insect pests of stored products seldom cause problems which are as immediately spectacular as those caused by many pests of field crops. Indeed, many common problems associated with administration and execution of almost any business tend to command a higher commercial priority in the view of the businessman than pest infestation control. The major obstacle to adoption of recommended technical control action is related to the difficulty of convincing those who must pay for and undertake the work that it is in their interest to do this - particularly as the pest hazard is often of an insidious nature.

Although stored-product entomology has been established for many years now as a sectional science and has yielded much important knowledge of practical value, the deeply entrenched, traditional, negative attitudes of societies, communities and individuals regarding the true significance of insect infestation have not been entirely overcome. That euphuistic and euphemistic term 'inherent vice' is still, in meaning, accepted by a considerable portion of the world community, including many in the so-called developed nations, and is still employed quite extensively in commerce and even in law.

The difficulty of convincing governments, industries and individuals of the need to expend funds and effort on storage pest control programmes is almost entirely associated with economics. The importance of the presence of a pest species on a commodity is often intangible as far as the producer, storer, trader or shipper is concerned: even when strict standards of hygiene are established in international trading operations with particular commodities, there is often a tendency for bodies associated with supply to consider that the buyers are making unnecessary demands. Storage scientists are not altogether blameless for the persistence of such unawareness in lay elements of the community, all too often do we still see references in correspondence and technical literature along the following lines:-

'As you are aware, the subject of crop losses is receiving increasing emphasis in connection with the steps and measures to improve the world food situation. Unfortunately, statistics on crop losses are either not available, or when they are available, are not very reliable.'

and

'The Committee noted that it was on the question of utilization of available supplies that the least information was available; in particular estimates on the percentage of production loss in various stages of the storage and marketing procedures were based on very inadequate material.'

It is the duty of storage advisors to develop the advocacy which will persuade governments and/or individuals in commercial business (no matter how large or small) to 'want to' take appropriate action against insect pests. Working enterprises continue to exist by virtue of their 'worthwhileness', whether this be financial profitability or material value is not important in terms of this study: no enterprise can continue to function if the input is incompatible with the return in real value terms. Stored-product entomologists cannot ignore the importance of sound economic argument as a stimulus for adoption of the control programmes which they propose.

Certainly, it is often extremely difficult to develop a satisfactory economic argument in favour of action when attempting to solve a stored-product insect pest problem. For example, a producer of cereal grains can be very difficult to convince that a light infestation of insect pests in a parcel of grain which he

wishes to trade has any real significance, particularly if no damage is evident - he cannot see why he should expend funds and effort on a disinfection treatment, particularly if the intending buyer is not likely to penalise him for the presence of infestation or pay a premium for freedom from it.

Sophisticated end users of commodities which are susceptible to insect attack generally respond well to advice on control; less aware storers, handlers and users, who may even accept infestation and its effects as being normal and inevitable, are far more difficult to persuade that corrective action is necessary. Greatest difficulty is encountered when a commodity is handled and traded through an extended and complicated 'pipeline' - it is difficult to relate 'responsibility for action' and 'benefit from it' in such circumstances: government and/or industrial responsibility and control has often proved to be essential in order to ensure that action is taken and benefits equitably allocated in this sort of situation.

**PRACTICALITY:** The practicality of any control recommendation, from the point of view of commercial application, is of great importance. The ultimate goal to be aimed for is perfection but it must be clearly understood that although virtually perfect technical solutions do exist for many stored-product insect pest problems they are not always suitable for *en bloc* assimilation into the environments of established industry. For example, it would certainly be very desirable for many of the world's major grain producing industries to be equipped with storage facilities which would be inherently sympathetic to convenient and efficient pest control; there is more than adequate technical knowledge available to enable that aim to be realised but because the solution would be predominantly of an engineering nature, that is, replacement or renovation of existing storage structures, it would be quite impracticable to press for immediate, general adoption of such action in an established industry. A more subtle strategy is necessary, the ultimate goal may remain unchanged but the route by which it is reached has to be sympathetic to the commercial realities.

The difficulties associated with recommending and implementing the best all round solution to a stored-product pest problem in an established industrial environment are easily enough understood. On the other hand, it is much more difficult to comprehend the slowness of many well developed industries to recognise stored-product pest control as an integral part of their operations and not merely as an ancillary service. This is particularly so when new storage facilities are being designed and there is an opportunity to incorporate basic features which would favour effective pest control. In other words, the message on pest control is not getting through with sufficient impact to all of the persons in positions of responsibility for action. Storage technology is a hybrid science which embraces a number of diverse disciplines; this does not mean that it is pursued by 'hybrid scientists' but it is imperative, if the most satisfactory results are

to be obtained, that a strong network of liaison be established between specialists in all of the disciplines associated with the solution of any particular problem. There is general agreement with this principle, however, in practical circumstances, cooperation often falls short of that which is desirable. One of the best examples of the effect of this inadequate understanding is to be found in the field of grain storage design; even in countries and industries where there is a well developed awareness of the importance of effective insect control in stored grain, stores are still being constructed which are inherently deficient in both layout and structural detail. This is a clear case of the entomologists failing to convince the engineers or the engineers being unwilling to be advised; whichever is the reason, the efficiency of the storage system suffers a long-term setback.

Stored-product entomologists are certainly not invariably satisfactory in regard to communication or collaboration; they, as much as anyone else, must take all possible steps to fully understand the position of others whose interests and activities are related in any way to commodity storage. In many situations it is appropriate for the entomologist to lead the move to closer collaboration - the capacity to do this well is, indeed, a major asset.

**MOTIVATION:** No standard approach can be taken to motivate an industry or an individual to adopt a recommended course of action to control a stored-product insect pest problem. Categorisation of any insect species as a pest is dependant on a number of diverse circumstantial possibilities - even this dictates that a special approach is necessary to encourage corrective action which suits the particular characteristics of each case.

Many problems are inter-related; for example, cross-infestation of commodities within transportation 'streams' is a constant hazard. Therefore, there seems to be little doubt that better defined international and intra-national standards relating to insect infestation of commodities, vehicles, ships and storage premises, together with improved administration of these standards in the interest of both efficiency and uniformity, would provide the most substantial foundation on which a persuasive argument in favour of adoption of control measures could be constructed.

Clearly understandable and substantial facts are required to persuade any businessman worth his salt that there is a need for him or his organisation to spend time, effort and money on pest control. Statistically and economically sound reasons have apparently not been constructed from sufficiently objective study in many industries throughout the world; this flaw in storage technology is undoubtedly responsible for the persistence of an attitude, subscribed to by many, that disinfestation of stored products is a cosmetic exercise. Much more work needs to be done on the effects of insect infestation of stored-products at industry, national and international levels. Reliable quantitative and/or qualitative results relating to all aspects of any insect infestation associated with any stored product could prove to be most

valuable.

**SELECTION OF A COURSE OF TECHNICAL ACTION:** Decision relating to the course of technical action most appropriate to the correction of a specific pest problem of any substantial magnitude requires inter-related consideration of likely cost, practicality, target efficiency and control possibilities. Often, too much emphasis is placed on minimisation of initial capital input and simplicity of action, to the detriment of long-term efficiency and economy. Detailed cost-benefit analysis of possible alternative control programmes, based on short, medium and long-term projections, contributes considerably to the objectivity of decision making and adds to the credibility of measures which are eventually proposed to industry.

**CONCLUDING COMMENT:** Integrated pest control is essentially a management concept which encourage employment of available, worthwhile, technical measures in the best combination to maximise efficiency, bearing in mind the real limits imposed by social, economic and technical considerations. There must be a close sympathy between technical aspects and industrial circumstances if a programme is ever to reach the stage of implementation and if best effect is to be gained from it. Scientists and other professional specialists will almost invariably be responsible for the assembly of technical elements, however, the management component essential to the practical viability of any integrated programme of control must be provided by industry administration. It is imperative that this essential participation be fostered.