Book Review

Post-Harvest Tobacco Infestation Control

Ryan, L.

Chapman & Hall, London 1995

155 pages, \$ 54,95.

Whilst infestation of tobacco by insect pests non-specific to tobacco has also been observed depending on the conditions of storage or the climatic zone, the greatest danger to stored tobacco is caused by the larvae of the tobacco beetle (*Lasioderma serricorne*) and the tobacco moth (*Ephestia elutella*). Therefore, the measures and methods described in this book deal, for the most part, with the special control of *Lasioderma serricorne* and *Ephestia elutella*. According to Ryan, the estimated yearly loss worldwide due to these insect pests is approximately one per cent of total stored tobacco, amounting to 300 million US\$. This is an enormous sum which justifies the high expenditure not only for prophylactic measures, but also for active control strategies to prevent or reduce infestation.

The book "Post-harvest Tobacco Infestation Control" which was written as a result of international collaboration by experts of the cigarette industry, is most welcome and fills a long-standing gap. The last comprehensive description of measures for the protection of tobacco against infestation and for the control of storage pests written by U.S.D.A. appeared as long ago as 1972. Consequently, in view of the further development of strategies and storage protectants for pest control, it was imperative for this topic to be dealt with anew.

The book is divided into nine chapters. In addition to the biology and specific characteristics of the two major insect pests, it provides an extensive description of the various tried and proven measures currently used, which may be employed for the protection of stored tobacco. In the author's opinion visual monitoring of newly deliv-

ered tobacco is absolutely indispensable. The most common monitoring method currently used in storehouses is the pheromone trap. In this context, Ryan provides a thorough survey of the advantages and disadvantages of pheromone traps in comparison with other kinds of traps (e. g. light traps, suction traps). In addition, he describes the chemical nature and biological effect of these sexual attractants on tobacco beetles and tobacco moths. A point of special emphasis here are the preventive and hygienic measures which are advisable to use for the protection of stored tobacco. The author stresses repeatedly the importance of preventive measures as part of an integrated pest management programme in order to minimize the use of pesticides. This includes, for instance, the performance of simple tasks, such as the regular cleaning of the machines and workrooms as well as the disposal of waste material. If these instructions for hygiene are strictly adhered to, it will be very hard for pests to gain a foothold in a tobacco storehouse, let alone to breed. During the last few years, physical methods, particularly low temperature treatment at minus 20°C of tobacco on arrival at the storehouse have seen increasingly wide use. Nevertheless, the author points to the fact that there are stages in the development of insects which are able to survive sub-zero temperatures for several days without suffering serious damage.

If, however, prophylactic or physical measures are insufficient in preventing or reducing infestation, insecticides will have to be used. The protectants that are suggested here are room and surface sprays which are effective as contact insecticides (e. g. pyrethrine), as well

as fumigants, such as metal phosphides producing phosphine. There are a number of countries which permit the use of methoprene, an insect growth regulator, in the form of Kabat and Dianex. Methoprene produces its effect slowly as compared to fumigants and contact insecticides and is therefore not suited for killing pests quickly. Nevertheless, Ryan is right in stressing that methoprene forms an important element within an integrated pest management programme particularly in view of its low toxicity to vertebrates and its easy handling. The author then gives an extensive description of the properties of Kabat, a commercial methoprene product which is usually applied in the stemmery process, whereas Dianex, another methoprene formula, which is preferably used in production, is dealt with here only briefly.

The most important fumigants used in the treatment of tobacco are the phosphines. Further, the use of inert gases such as carbon dioxide has recently gained ground. However, this presupposes that adequate equipment for vacuum or pressure fumigation is available. Unfortunately, the author does not address the development of possible future methods such as the use of nitrogen for the protection of stored tobacco.

In summary, it can be stated that the book "Post-harvest tobacco infestation control" provides interested readers with ample information on preventive measures for the control and elimination of insect pests in stored tobacco and tobacco products. However, it is regrettable that the author concentrates mostly on describing current methods which complement each other, while only little space is devoted to discussing future developments. Thus, *Bacillus thuringiensis* preparations for the control of tobacco moths are dealt with although it has long been known that certain strains of *Bacillus thuringiensis tenebrionis* are also suited for controlling tobacco beetles.

Bacillus thuringiensis insecticides could in future be used for the protection of stored tobacco e. g. in the form of combined preparations containing endotoxins against *Ephesia elutella* and *Lasioderma serricorne*. New insecticidal agents of plant origin could also introduce a new dimension in the use of modern and up-to-date storage protectants. The obvious candidates that come to mind here are extracts of the Neem tree (*Azadirachta indica*). But other relatives of this extraordinary plant as e. g. *Melia volkensii* or *Azadirachta excelsa* also produce substances with an enormous toxic potential for a large number of pests. Further, it is planned to improve the effect of pheromones on insects to such an extent that not only male but also female insects are attracted, so that trapping quotas will be achieved which go beyond pure monitoring.

The author is right in stressing that the use of pesticides in tobacco processing and storage should be kept to a minimum and that infestation should already be prevented from the outset by thorough hygienic precautions. However, there is no doubt that it will still be necessary in future to use pesticides on a case-by-case basis. Those substances should have a highly specific toxic effect on the pests, and care should be taken to ensure that the formulae are easy to handle and pose no risk to humans and the environment.

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