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Pest Management Strategies for Inspection & Certification of Millet Crop

H.H. Khan, Amit Tomar, A.K. Mishra, S.P. Singh, Prachi Patel & R.P. Singh
ICAR-Krishi Vigyan Kendra, Gajraula, Amroha, Directorate of Extension,
Sardar Vallabhbhai Patel University of Agriculture & Technology, Meerut, U.P., India

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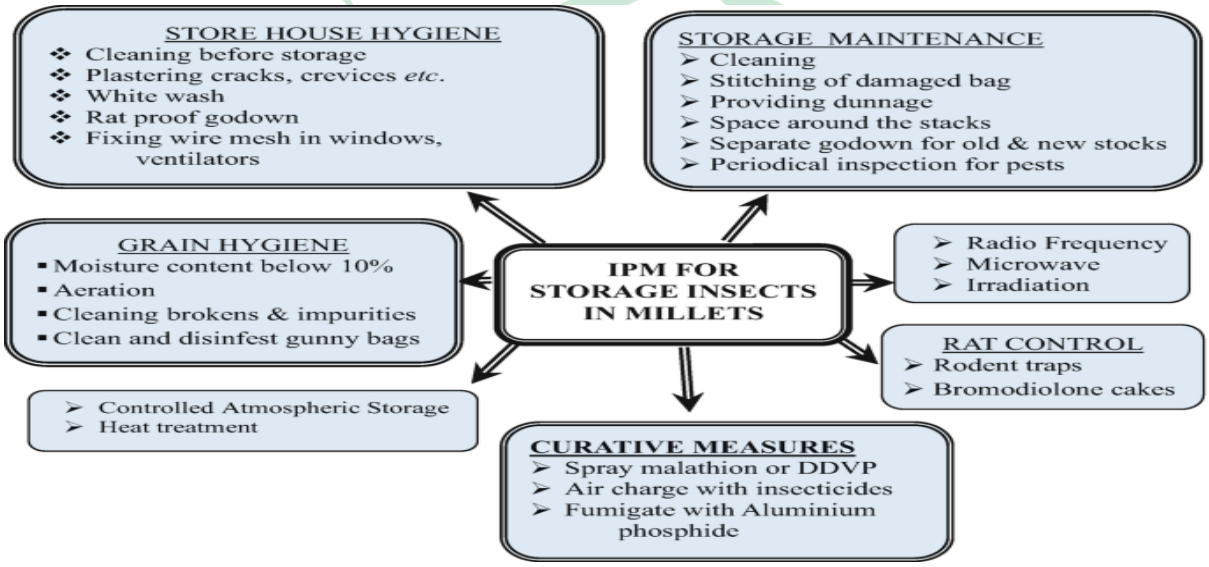
Introduction:

The number of insect pests known to attack pearl millet is variable, and in West Africa, the number of species is estimated to range between 81 and over 150. Despite the list of many species reported as pests or potential pests, the number of species classified as major pests of economic importance is apparently less than a dozen (Mwanze and Harris, 1992 quoted by Youm, 1995) with the millet head miner (*Heliocheilus albipunctella*) ranking second to non in all insect pests (Youm, 1995). The main pest of millet panicles found in Mali in the period 1985-1990 were: The millet head miner, *Heliocheilus albipunctella* de Joannis (Lepidoptera, Noctuidae). Six major grasshopper species (Orthoptera, Acridae): *Oedaleus senegalensis* Krauss, *Kraussaria angulifera* Krauss, *Hieroglyphus daganensis* Kraus, *Cataloipus cymbiferus* Krauss, *Diabolocantatops axillaris* Thunberg, and *Kraussella amabile* Krauss. The control of pests which millet panicles can be achieved by spraying the crop with 50 percent (w.p) carbaryl at 3kg/ha in 600 litres of water (FAO, 1972).



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Two major genera of flower-feeding beetles (Coleoptera):

Pachnoda interrupta Olivier (Scarabaeidae), chafer beetles, and three species of *Psalydolytta* (Meloidae), blister or oilbeetles often referred to as "cantharides" in Francophone West Africa. *Pachnoda interrupta* and *K. Amabile* are diurnally active and not attracted to light. Theirpopulations were in the fields during daylight (Ago, 1995). The grains of pearl millet are sufficiently large for the destructive attack by the major pests such as *Rhyzopertha dominica* and *Trogoderma granarium* (Mc Farlane *et al*., 1995). For thisreason, the popular concept that millets are hardly susceptible to damage by storage insect pests is erroneous, except for the very small grained millets such as tef and fonio. Another factor contributing to a general myth that millets are immune to susceptibility to insect pest attack is the fact that millets are grown in semi-arid climates, where stored grain is typically very dry, with moisture contents often in equilibrium with humidities below 40 percent. In such conditions, the warehouse moths and most secondary beetle pests do not thrive. However, the major pests *R. dominica* and *T. granarium* are relatively well adapted toextremely dry conditions and will cause serious damages (McFarlane, 1995). The control of such pests as *Rhyzopertha dominica* (Lesser grain borer) and *Trogodermagranarium* (Khapra beetle) may be achieved through sealed storage e.g. in drums or underground storage. In Sudan for example, an underground storage may carry up to 30 tonnes of grains. Alternatively, Khapra beetle may be controlled by dusting the grains with Pirimiphos Methyl(Actellic) which has a wide spectrum of activity against beetles, bruchids, moths and mites (Odogola and Henriksson, 1991).

Pollination Control Mechanism of Pets:

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Population control of *Rhyzopertha dominica* and *Trogoderma granarium* during drying of millet can be achieved by lowering the drying temperature. For example, the optimum reproduction temperature for *Rhyzopertha dominica* is 30-35° C. Therefore, a temperature around 21° C could check reproduction and therefore control the pest (Odogola and Henriksson, 1991). Likewise, *Trogoderma granarium* reproduces well in temperature range of between 33 and 32° C. Lowering this temperature to around 22-25° C during drying would check the reproduction.

Relative status of major pests species:

Majid *et al*., (1989) reported that stem-fly (*Atherigona miliaceae*) was the major pest, but its damage was greater on Proso than on Fox tail millet. They reported that the extent of damage might vary from 15-25 percent depending on the year, location and genotype. The other minor insect pests that they reported in the millet fields are stripe borer, pink borer flea beetle, aphid and pentatomid bug.Commonly found diseases on millets, which they reported were: Foot rot (*Sclerotium rolfsii*), leaf blast (*Pyricularia setariae*) leaf spot (*Helmithosporium sp*.), leaf and sheet blight (*Drechslera* sp.) And grain spot (*Phoma* sp., *Fusarium* sp. and *Curvularia* sp.)**.** Foot rot caused by Sclerotium rolfsii was reported to be an important disease and mortality is high on millet. Small millets are vulnerable to different spectra of field pests and diseases (Rao, 1989). Finger millet is more vulnerable to diseases like blast and viruses and barnyard millet to smuts (Rao, 1989). Little and proso millets are more susceptible to pests like shoot fly whilebores occur on finger and barnyard millet. The incorporation of genetic resistance offers thebest choice in low input crops like small millets. Cultural controls like early planting and appropriate croppingsystems could also reduce the pest and disease incidence. The insect problems on pearl millet are of less importance than on sorghum. The major problems are from stem borers; this is also true for finger millet. There is a head girdler that produces a spiral - like effect moving length-wise up the pearl millet head. Ins some conditions, army-worms and aphids can be a problem. The species are essentially the same as on sorghum, and are similar. Soft grain pearl millet is more subject to attack than hard grain(House *et al*., 1995). Rodents like rats and mice are also an important pest of millet. They pose a keen threat especially in storage. For modern storage structures with plastered and sealed walls, rodents may not be too much of a problem. Also underground storage of sealed drum storage may keep away rodent attack. For most of the traditional storage structures, rodent attack is serious

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problem. They bore holes in bags and destroy the millet grains during storage. In addition to destroying the grains, rodents contaminate the grains with their excreta, thereby reducing the quality. In some parts of developing countries, such as Tanzania, Uganda, Kenya and Malawi, farmers use rat guards on mud-and-straw structures in order to check the infestation of rodents (Figure 23).

Weed pests:

Striga hermonthica is an important weed pest of finger millet in East Africa. Control measures involve uprooting before seedling, crop rotation and the possible use of chemicals (Gupta *et al*., 1989). Insect and animal pests include: locusts and grasshoppers stem borers and foliage caterpillars.

Mycotoxins in millets:

Compared to other grains such as sorghum, relatively few studies have been made on the mycotoxin content in millets (Mc Farlane *et al*., 1995). *Aspergillus terreus*, a producer of patulin, has been isolated from pearl millet. A lot of other toxigenic fungi have also been isolated. *Claviceps fusiformis* Loveless, which produces alkaloids, is widely distributed onpearl millet, and causes major reductions in crop yield and quality. (Source: Odogola and Henrikson, 1991).