

O.41 - Efficacy of various non-chemical methods against pulse beetle, *Callosobruchus maculatus* Fab

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Pulses (grain legumes) are excellent sources of proteins (20-40%), carbohydrates (50-60%) and are fairly good sources of thiamin, niacin, calcium and iron. In India, over 200 species of insects have been recorded infesting various pulses both in the field and storage. Among these, the pulse beetles *Callosobruchus* spp. are the major pests in storage. Generally, infestation starts in the field but population builds up in storage as the insect feeds inside the seed and emerges as an adult and causes secondary infestation inflicting heavy losses. The infested seeds are rendered unfit for human consumption as well as for sowing purposes. The most practical and successful method of controlling these insects are chemical methods. But due to environmental concerns there is a need to develop ecofriendly approaches such as physical methods. These comprise thermal treatments (both low and high temperature) and radiations (microwave, gamma rays and electron beam). Exposure of green gram seeds infested with different stages of *Callosobruchus maculatus* viz., egg, early larva, late larva and pupa to low temperatures at $20 \pm 1^\circ\text{C}$, $9 \pm 1^\circ\text{C}$ and $-14 \pm 1^\circ\text{C}$ for 24h revealed that all the stages were highly sensitive to a temperature of $-14 \pm 1^\circ\text{C}$ and adult mortality at this temperature occurred within 12 min. Exposure of cowpea seeds infested with different stages of *C. maculatus* at 50°C for 2h, 4h and 6h revealed that all stages are sensitive to an exposure period of 6h at 50°C while complete mortality of adults at this temperature is achieved within 12 min. Exposure of cowpea and green gram seeds infested with different stages of *C. maculatus* to microwaves generated at frequency 2450 MHz for 70 seconds was effective against all the stages of pest. Exposure of adult *C. maculatus* to different doses of gamma rays revealed that a dose of 100Gy has a sterilizing effect on adults. These treatments have no significant effect on the germination of seeds. Further, the exploitation of electron beam for the control of this pest is in progress.