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A QUARANTINE NOTE ON *PROSTEPHANUS TRUNCATUS* (HORN) — A PEST THAT NEEDS TO BE WATCHED

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THE larger grain borer *Prostephanus truncatus* (Horn) (Coleoptera: Bostrichidae) has recently attracted attention because of its spread to new areas. Till recently it was noted only from central America, southern USA and northern parts of south America[1] and occasionally in imported maize from Israel[2] and Iraq[3]. Its spread to and establishment in Tanzania[4] and Togo[5] in Africa, all the way across the Atlantic (where maize is an important crop) is a serious development. Its further spread within Africa appears only to be a matter of time and with this enlarged distribution chances of further spread would be much greater.

In India, the pest was intercepted thrice during quarantine processing of the germplasm material of crop plants imported for research. Two of these interceptions (1971 and 1977) were from consignments of maize seed from CIMMYT, Mexico and one (1971) of paddy from IRRI, Philippines. Interception from one maize consignment revealed the presence of live adults and in the other two cases dead adults. Similarly, for the first time, *P. truncatus* was found in a consignment of samples of jowar, maize and wheat received from Almorah (Uttar Pradesh, India). Till then it was not reported in jowar seeds and therefore adds another new host recorded for this bostrichid[6]. During examination and processing of the consignments, the insects were identified as *Rhizopertha dominica* (Fabricius) and put away. However, a well-illustrated key by Hodges[7] greatly helped in separating *P. truncatus* from *R. dominica*.

It may be conjectured that *P. truncatus* probably entered the country with other hosts and then established on jowar. Otherwise, it is essentially a pest of maize and cassava though under laboratory conditions it infests and subsists for long periods on butterbeans (*Phaseolus lunatus*), cocobeans, paddy, wheat[1] and perhaps on a variety of other material. On maize, infestation often starts in the field. The beetles bore into the seeds and move from kernel to kernel causing serious damage. As high as 34% loss after 3–6 months of storage has been reported from Tanzania, though the average loss has been worked out[8] to be 8.7% as compared under similar circumstances to 2.6% in Zambia[9], 3.6% in Kenya[10] and 2.5%in Malawi[11] caused by pests like *Sitophilus oryzae* (L.), *S. zeamais* Motschulsky and *Sitotroga cerealella* (Oliv.).

The fact that *P. truncatus* can subsist on a variety of substances, often for long periods and that it can be mistaken for the cosmopolitan stored grain pest — *Rhizopertha dominica*, greatly increases the chances of its unobtrusive entry with imported material, especially if the material is imported in bulk. Effective inspection and treatment of bulk import is not only difficult but rather impossible, to ensure freedom from this insect. As a rule, all incoming material should be fumigated at the port of entry and the workers connected with quarantine processing be made aware of the characters which differentiate this species from other related bostrichids so that they can assess the importance of the pest they have intercepted. The keys provided by Kingsolver[12] and Hodges[7] should prove very useful and seed inspection should be done in a closed room not directly exposed to outside atmosphere. Surveillance studies must be conducted in the country especially in and around Almorah (Uttar Pradesh) and if it does occur, efforts should be made to enforce suitable domestic quarantine restrictions and develop methods to suppress it locally.

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TOXICITY OF $HgCl_2$ AND CH_3HgCl TO *CHLORELLA VULGARIS*

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KNOWLEDGE regarding the relative toxicity of metals to biota contributes towards our understanding of the hazards of metals pollution in aquatic ecosystem. Algae have been widely reported to concentrate metals in their system[1–3]. A few of the important references related to the problem are those of Bartlett and Rabe[4], and Hannan and Patouillet[5]. The effect of mercury on algal growth rates was observed by Hannan and Patouillet[5]. Rachlin and Ferran[6] pointed out the growth response of the green algae *Chlorella vulgaris* to selective concentration of zinc. In the present study we evaluate the ion of the LC_{50} of mercuric chloride ($HgCl_2$) and methyl mercuric chloride (CH_3HgCl) for unicellular algae *C. vulgaris* and the effects of these chemicals on the growth potential.

Stock culture of *C. vulgaris* was maintained in the basal Zarrouk's medium in corning conical flask of one litre capacity[7]. Both stock and experimental cultures were maintained under artificial lights. Inoculum was prepared from the stock cultures and grown in Zarrouk's medium for two days. When it attained an exponential growth stage, the culture was dosed with $HgCl_2$ and CH_3HgCl.

Experiments were carried out in screw cap bottles (corning 30 ml capacity), each set kept in triplicate and the whole experiments repeated twice. The cultures were exposed during the 24 h of the day to artificial light having intensity nearly 3000 lux unit. Growth of algae was measured taking optical density measurements in double cell colorimeter. Observations were made for 10 days.

Screening experiments were conducted to establish the toxicity ranges. The toxicity test range was between 0.022 mg/l and 0.122 mg/l for $HgCl_2$ and between 0.018 mg/l and 0.102 mg/l for CH_3HgCl. Exponentially growing culture was taken in the culture flask and dosed with the toxicant for the desired concentrations. The dosed cultures were then distributed in three screw cap bottles (30 ml capacity) and kept in identical conditions. Obser-

Table 1 *Toxic effect of $HgCl_2$ and CH_3HgCl on per cent mortality of Chlorella vulgaris*

Time (days)	% mortality in different concentrations of $HgCl_2$ (mg/l)							
	0.080	0.086	0.092	0.098	0.104	0.110	0.116	0.122
2	16	27	33	38	53	59	72	89
4	20	30	25	47	49	66	89	100
6	13	22	37	49	64	78	100	
8	19	27	50	57	70	90		
	% mortality in different concentrations of CH_3HgCl (mg/l)							
	0.066	0.072	0.078	0.084	0.090	0.096	0.102	
2	16	23	33	44	71	71	87	
4	23	19	26	38	60	75	100	
6	20	21	31	46	65	78		
8	18	23	39	50	65	79		

LC_{50} values 0.092 mg/l for $HgCl_2$ and 0.084 mg/l for CH_3HgCl.