frequency. Near the base of the gall, especially immediately below the surface, of the palisade and spongy tissue were conspicuously hypertrophied. This resulted in much elongation of both the types of tissues. Intercellular spaces in between spongy parenchyma were much reduced. Towards the apices and in the neighborhood of the gall cavity the cells were undifferentiated. Vascular bundles were scattered irregularly in gall parenchyma. In mature galls, a layer of scherenchymatous cells developed surrounding the pear shaped gall cavity which opened through an ostiole on the ventral side of the leaf. The number, size and shape of chloroplasts in the infested galled tissue was markedly reduced. The thylakoid membrane became thin, loosely arranged. The differentiation between grann and stroma was lost. On the other hand, there was an increase in the number and size of mitochondria in the galled tissue. However, mitochondria and other cell organelles were fully degenerated and the protoplast was much reduced.

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Incidence of Stone weevil on Ber in Hot arid region

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The ber (*Ziziphus mauritiana* Lam.) is an important hardy fruit crop growing in the marginal land of western hot arid Region of Rajasthan. Among the biotic stresses, the insect pests are major constraints causing significant loss. The pests like fruit fly (*Carpomyia vesuviana* Costa), chafer beetle (*Holotrichia* sp.) and bark eating caterpillars (*Indarbela tetraonis* Moore) (*Indarbela quadrinotata* Walker) are considered as major pests of this region (Singh, 2008). In addition, recently the severe incidence of stone weevil (*Aubeus himalayanus* Voss) has been recorded in the Experimental Farm of C.I.A.H., Bikaner during 2008-2009. Bhatnagar and Lakra (2003) reported cicadellids on ber in Haryana. This study was therefore undertaken.

After the initial detection, the fortnight observation of stone weevil incidence on Gola and Seb varieties was recorded through periodical sampling from 10 unsprayed randomly selected ber trees of uniform vigour and size. The sample from selected branch of each tree was drawn from upper, middle and lower strata of canopy. The total number of fruits and infested fruits from each branch were recorded and % infestation was estimated. Subsequently, the fruits of equal size with five sample consisting of 20 fruits were also drawn from the ground fallen fruit and % infestation was

computed. The weevil damage was examined by cut opening the fruit. Naked ovipositors puncture on fruit by adult female was also taken into account as an infested one. To assess the serious course and intensity of weevil infestation on immature fruit dropping on each cultivar throughout the season, the dropped fruits were collected and examined from surrounding the canopy of selected trees at fortnight interval. The total number of dropping and infested dropping was recorded and percentage was worked out from three trees of each cultivars.

The adult female weevil laid the eggs on the stylar end of fruit with the help of long rostrum and newly hatched grubs enter into seed by making puncture in endocarp at immature stage and fed on soft seed coat then, it entered into endosperm and moved towards downward. After few days, the grubs completely got into the seed, covered with seed coat and it started feeding on inner content of the seed, and pupated within the seed by making hallow galleries. The weevil completed its life cycle with single fruit. During the course of feeding, the fruit dropping was more in the small fruits with soft seed coat. The infestation also caused the immature fruit ripening, shrinking and fruit dropping. In severe cases, the misshaping of fruits was also observed due to endosperm damage.

$$\% \text{ fruit drop} = \frac{\text{Infested fruits (dropping)}}{\text{Total dropped fruits}} \times 100;$$

Throughout the period from October to February, the incidence of fruit weevil was high in Seb variety compared with the Gola. Initially, it was

Table 1. Mean comparison of stone weevil incidence on different ber varieties.

Variety	Mean damage (%)		Pooled mean
	Tree sampled	Ground fallen	
Gola	15.6	32.4	23.63
Seb	31.6	54.1	43.28
mean	23.6	43.2	33.45

** Significant P= 0.01

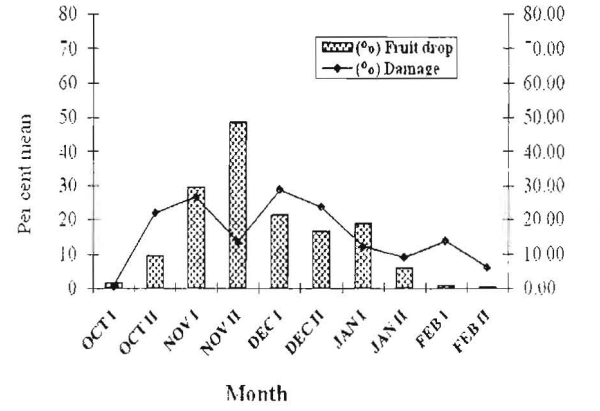

Fig. 1. Fruits drop Vs stone weevil incidence on ber (Gola).

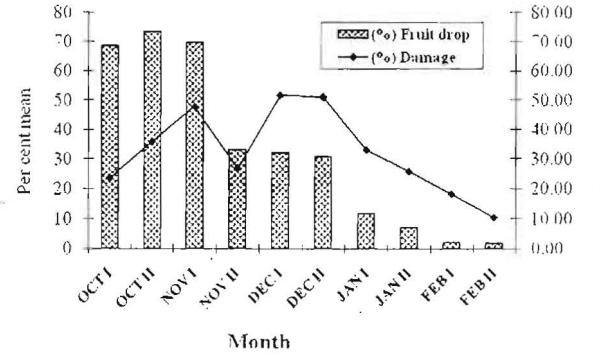

Fig. 2. Fruits drop vs stone weevil incidence on ber (Seb).

recorded during I[st] fortnight of October on Seb (23.5 %) and II[nd] fortnight of October on Gola (21.9 %). The maximum infestation (28.8 %) on Gola and Seb (51.8 %) was recorded during I[st] fortnight of December on tree sampled and I[st] fortnight of December on Gola (74.1) and II[nd] fortnight of December on Seb (89.8) in ground sampled (fallen) fruits. The immature fruit dropping was maximum (48.5 %) in II[nd] fortnight of November in Gola and II[nd] fortnight of October (73.4 %) in Seb (Fig. 1&2) and it was always high in Seb than Gola. The overall pooled mean damage was 23.6 and 43.2 % in Gola and Seb, respectively. The significant variation was observed among the two cultivars with respect of mean % incidence of stone weevil (Table 1). In both cultivars, the seed infestation rate was higher in the fruit collected from the ground compared to the tree sampled fruits and it was very severe during early stage of development. The data

revealed that the weevil infestation was found throughout the season with two peaks at mid-November and December in Gola and Seb and intensity of damage was more during early stage of fruit development and the fruit dropping was more during early stage of fruit development. The fruits infested after ¾ of maturity showed only the egg laid punctured and it was not favoured to the grub development. However, very few published information is available about this pest (Balikai 2008).

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Adoption of IPM among the farmers' in Uttar Pradesh.

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Crop Protection is an essential and vital aspect of crop production. Farmers, adoption of IPM package depends on many factors, such as their technical skills and socio-economic conditions. Therefore, it is essential to judge the depth of knowledge and their adoption among the farmers of IPM of Bahraich, Shraswati and Raebareli districts of Uttar Pradesh. The study was conducted in North Eastern U.P., representing most backward regions in terms of agricultural productivity and input used. Farmers were interviewed personally and primary data were recorded about adoption of IPM. Hundred farmers were selected randomly from each block in all the three districts and were interviewed. A questionnaire has developed about the different Farmers practices with particular emphasis on plant protection and adoption of IPM practices were as under-

Agro Techniques/Cultural Practices: Selection of improved varieties; Knowledge about crop rotation; Destruction of crop residues and weeds; Summer ploughing; Timely sowing/transplanting; Pruning and spacing; Bunding and leveling of fields; Balanced use inorganic fertilizers and awareness about biofertilizers; Sowing of trap crop; Seed treatments and line sowing/planting.

Mechanical Methods: Awareness bio-control agents (*Trichoderma* spp., *Pseudomonas* spp., *Bacillus* spp. *Beauveria* spp. etc.); Awareness and use of bio-pesticides; Awareness and use of natural enemies, parasites and predators

Chemical Methods: Awareness about safe chemical pesticides and Awareness of pesticides use.

In the study area, most of the farmers perceived that frequency of infestation of insect and disease had increased over the past few years. Farmers' access to pest management information in a variety of ways. Hence, development of any outreach programme can benefit by finding the most commonly used method by farmers. It was found that farmers accessed the information on pesticides use through multiple sources. The main sources were private dealers (83, 65 & 74%, respectively) followed by the extension personnel of State Agricultural University (49, 43 & 24%, respectively) and fellow farmers and media sources (25, 29 & 20%, respectively). The most important criterion for insecticide application was their own determination of pest-infestation levels (Maurya,1993). In Raebareli district, 43.5% of