

These observations are being critically pursued further. In view of the common basic number 14, both in *A. ricini* ($2n=28$) and in *B. mori* ($2n=56$) any possibilities of their phylogenetic interrelations are being investigated.

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INHERITANCE OF SPOT-VARIATION IN *EPILACHNA* (COLEOPTERA : COCCINELLIDAE)

Two species of *Epilachna* beetles, 12 spotted (*Epilachna dodecastigma* Muls.) and 28 spotted (*Epilachna viginti-octopunctata* Fabr.), are the regular pests of vegetable crops in Bihar. While studying their life-history and biology, spot variations were observed on the elytra of these beetles. It was, therefore, considered worthwhile to investigate the factors which control spot-variation.

The phenomena of spot-variations have caused a lot of confusion in literature for identification work. On the basis of spot-variations, Chopra (1925) reported five species of *Epilachna*, viz., 12 spotted, 16 spotted, 24 spotted, 26 spotted and 28 spotted. Kapur (1950) stated that the identification of *Epilachna* spp. had become difficult on account of spot-variation. Wesley (1956) carried out studies on spot-variation and concluded that 12 spotted and 28 spotted are one species and designated it as 12-28 *Epilachna* sp.

Stock-culture of the *Epilachna* sp. was maintained on the leaves of potato, tomato and brinjal in glass bottles (10 cm. high and 9 cm. in diameter) with perforated lids. During summer months, a layer of sand 2" thick was placed at the bottom and was kept moist by sprinkling water on the sand layer. Fresh leaves were renewed each day. This breeding technique

helped considerably for rearing the insect successfully under indoor conditions.

Results.—(1) The population studies of the *Epilachna* beetle brought to light three pertinent biological facts: (a) the 12 spotted beetles were found to outnumber the 28 spotted, (b) 12 spotted and 28 spotted were always found in close association on plants, and (c) nine types of spot variants (12 spotted, 14 spotted, 16 spotted, 18 spotted, 20 spotted, 22 spotted, 24 spotted, 26 spotted and 28 spotted) were observed. These facts indicated the possibility of cross-breeding between 12 spotted and 28 spotted beetles in nature.

(2) The 12 spotted and 28 spotted beetles were, therefore, isolated and were inbred. The pure inbred races of 12 spotted and 28 spotted were established when inbreeding was practised for six successive generations.

(3) The crosses between the inbred lines of 12 spotted females and 28 spotted males were carried out successfully. The progeny of first generation of the cross yielded nine spot-variations (12 spotted, 14 spotted, 16 spotted, 18 spotted, 20 spotted, 22 spotted, 24 spotted, 26 spotted and 28 spotted). In case of reciprocal cross between 12 spotted and 28 spotted, the females laid eggs, but they failed to hatch. This inviability of eggs may be due either to incompatibility between 12 spotted males and 28 spotted females or to environmental factors. The factors which account for inviability of eggs are still under investigation.

The nine types of spot variants obtained as a result of crossing between 12 spotted and 28 spotted agree with those observed in the field. It seems, therefore, that the nine groups of *Epilachna* beetles are not different species but are variants out of cross-breeding between 12 spotted and 28 spotted in nature. Spot-variations due to cross-breeding between the two related species of *Epilachna* have not been recorded before.

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