susceptible genotypes (85 to 100% injury) and test-cross involving FR (S), were found to contain only susceptible genotypes. This ascertained their homozygous recessive nature for this character. The genetic make-up of these Indian varieties is given below:

Moderately frost resistant varieties *viz.* Kufri Sheetman, Phulwa and FR(R) :

$$F^{r1}f^{r1}\ F^{r2}f^{r2}\ F^{r3}f^{r3}\ F^{r4}f^{r4}$$

Slightly frost resistant Kufri Dewa :

$$F^{r1}f^{r1}\ F^{r2}f^{r2}\ F^{r3}f^{r3}\ f^{r4}f^{r4}$$

Craigs Defiance, Kufri Lauvkar, FR (S) and other extremely frost susceptible varieties.

$$f^{r1}f^{r1}\ f^{r2}f^{r2}\ f^{r3}f^{r3}\ f^{r4}f^{r4}$$

The possibility of oligogenic nature of inheritance for frost resistance based on an experiment using electrolyte-leaching test was mentioned[4]. The present study confirms this under conditions of natural frost. It also suggests that the resistance in Indian frost-resistant varieties is due to the presence of 3-4 independent genes exhibiting a cumulative effect.

27 *October* 1981.

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SEXING OF THE 28-SPOTTED EPILACHNID, *HENOSEPILACHNA VIGINTIOCTOPUNCTATA* (F.) AND SOME OBSERVATIONS ON ITS FECUNDITY AND OVIPOSITION.

J.K. GUPTA* AND ASHOK KUMAR
Department of Bio-Sciences, Himachal Pradesh University, Summer Hill, Simla 171 005, India
*Department of Entomology-Agriculture, H.P.K.V.V., College of Agriculture, Solan 173223, India.

THE 28 spotted epilachnid, *Henosepilachna vigintioctopunctata* (F.), is one of the most injurious pests of Solanaceous crops. Various attempts have been made for the control of this pest by chemicals and radiations. Sexing is an important step in any rationally planned attempt for the control of insects or pests.

Different morphological characters have been used for sexing the coleopteran insects. In some size, variation forms the discernible character for sexing[1]. while in others, morphological characters of the abdomen have been used[2,3]. In the present study, we have described a few important characters by which live beetles can be sexed without causing any damage to them. A few observations on the ovipositional behaviour of the female, longevity of the adult insect and the effect of removal of male after mating have also been described.

Potato epilachnid, *H. vigintioctopunctata* (F.), reared on potato leaves at $30^0 \pm 1$ and photoperiod of 17L:7D showed wide variation in size among both the sexes. Five-day old insects showed that the male was slightly smaller (5.4 mm long, 4.6 mm wide) than the female (6.0 mm long, 4.9 mm wide). But correct sexing could not be done on this basis. There was still a 40% chance of committing an error in sexing the beetles. Therefore, other features to sex them were investigated. The beetle was gently pressed to expose the tip of abdomen from elytra. In males, aedeagus can be revealed as a brown line running along the translucent abdominal sterna (figure 2). Abdominal tip of the male beetle is somewhat pointed and of the same colour as the venter. However, in the female it appears broader, dark coloured and is made of two distinct dark-brown plates (figure 1) as against one in male. On the basis of these characters a sex ratio (male to female) of 1:1 was obtained which agrees with the value reported by Pandey and Uma Shanker[4].

For observations on the mating behaviour and fecundity, newly emerged beetles were sexed and a pair was released in each of the 250 ml container. Each observation was replicated five times. In most of the cases mating started after 4 days of adult emergence.

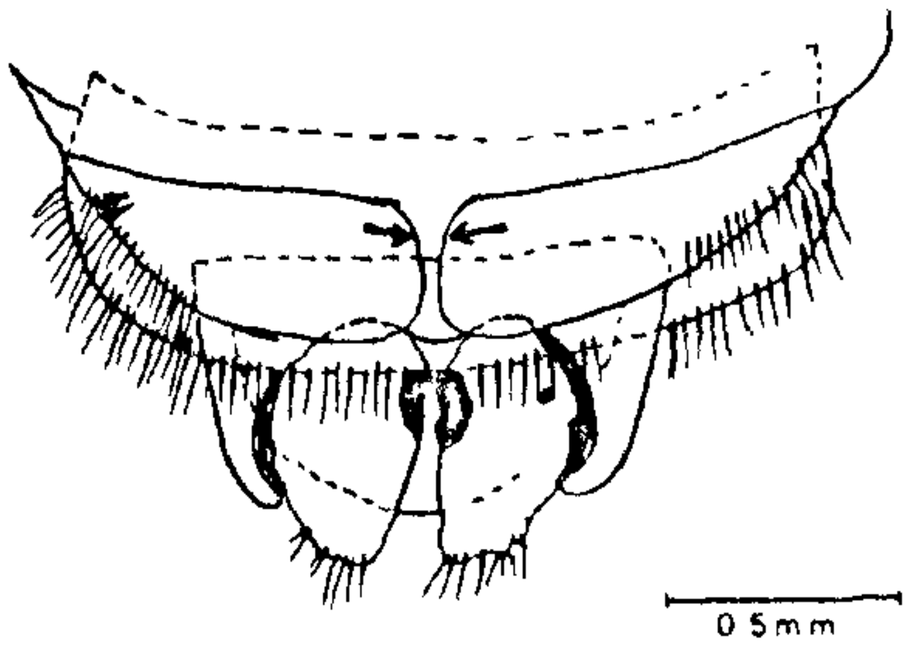

Figure 1. Terminal abdominal sterna of female *H. vigintioctopunctata*. Arrows indicate divided sternal plate of eighth uromere which forms a discernible character to sex the female.

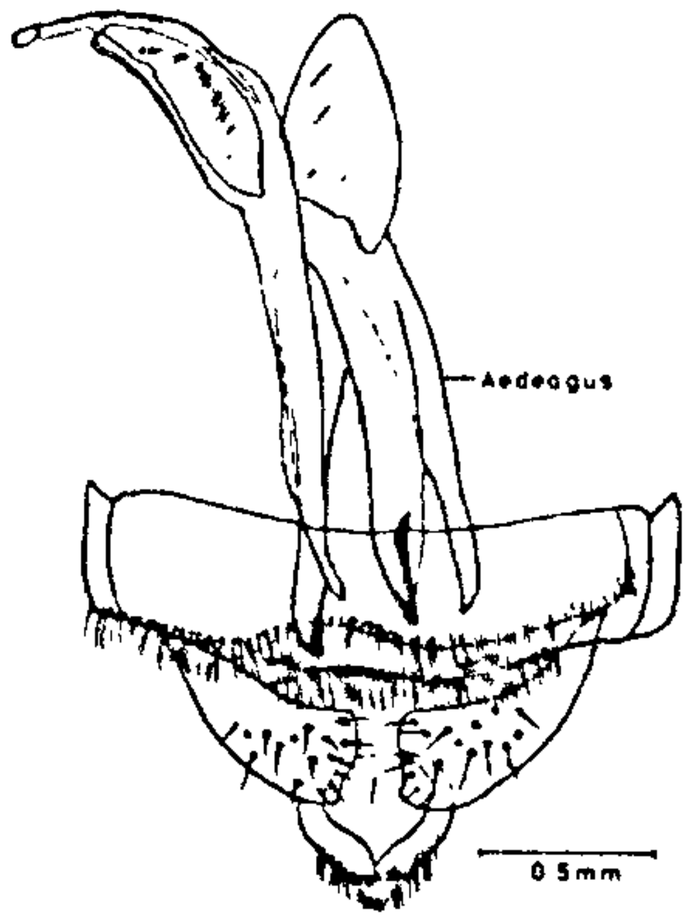

Figure 2. Terminal abdominal sterna of male *H. vigintioctopunctata*. Arrows indicate undivided distinct sternal plate of eighth uromere.

Each mating lasted for 35 to 50 minutes. Pre-oviposition period ranged from 7 to 15 days. Impregnated female laid on an average 502 eggs during an ovipositional period of 40 days. Egg hatch ranged between 62 to 90%. One female exceptionally laid as many as 1108 eggs. Longevity of female was 43 to 85 days and of male 50 to 90 days. The female laid eggs in batches of 5 to 55 almost daily or on alternate days depending on the size of the cluster. Virgin females also laid eggs but at reduced rates and in this case single egg laying was common.

On removal of male after the mating, the female continued to oviposit but at an increased rate. On an average, during an ovipositional period of 26 days a female laid 305 eggs having 70.2% hatchability when the female was allowed to remain with male. But after removing the male, the average number of eggs laid increased to 368 with 65% hatchability. It is proposed that the reason for this increased oviposition may be due to the absence of male which may otherwise interfere in the oviposition during multiple matings.

Authors thank Professor H.O. Agrawal, for providing facilities. One of us (JKG) is thankful to the CSIR for a fellowship.

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PROSTAGLANDIN $F_2\alpha$ INDUCTION OF OVULATION IN THE MUSK SHREW, *SUNCUS MURINUS L.*

JYOTI SEETAL SINGH AND C. J. DOMINIC
Department of Zoology, Banaras Hindu University, Varanasi 221 005, India.

THE musk shrew which is a reflex ovulator readily ovulates following single injection of PMSG, HCG, LTH, LH or FSH[1]. Prostaglandins have been shown to induce LH release and ovulation in certain mammalian species[2] and hence it was considered worthwhile to investigate the effect of prostaglandin $F_2\alpha$ ($PGF_2\alpha$) on ovulation in the musk shrew.

Nine adult wild-caught females weighing about 70 g were divided into three groups of three each. Animals in Groups I and II were given injections (i.p.) of $PGF_2\alpha$ (tromethane salt, Upjohn Co., Kalamazoo, Michigan), 1·5 mg/female/day, for 1 and two days respectively. Animals in Group III which served as controls received injections (i.p.) of normal saline, 0·05 ml/female/day, for 1 day ($N = 1$) and 2 days ($N = 2$). Animals were killed 24 hr after the last injection. At autopsy the reproductive tracts were flushed with normal saline for the recovery of ova and the ovaries were carefully examined for the presence of newly formed everted corpora lutea[1, 3].

The results are presented in table 1. Ova were recovered from the genital tracts and newly formed everted corpora lutea were present in the ovaries of all females killed 24 hr after $PGF_2\alpha$ administration. Although ova were not seen in the genital tracts of females in Group II, newly formed everted corpora lutea were present in the ovaries suggesting recent ovulations. The failure to recover ova from these shrews is presumably due to the fact that the liberated eggs had already passed down the reproductive tract. In four of the six ovulated females more ova were shed from the left ovary than from the right (table 1). Moreover, in these animals the left ovary released at total of 13 eggs in contrast to the 6 by the right ovary suggesting a functional dominance of the left ovary in the musk shrew[3] comparable to that reported in the white-toothed shrew[4].

Induction of ovulation in the musk shrew by $PGF_2\alpha$ administration as revealed in this study is consistent with the reports in the mouse, guinea pig and hamster[2], cow[5] and mare[6]. Since prostaglandins have been shown to induce LH release from the pituitary both *in vivo* and *in vitro*[2], it appears likely that the ovulations following $PGF_2\alpha$ administration are brought about