parasites[12]. They did not parasitize uzi fly maggots but developed successfully on the pupae. These parasites are easily maintained in the laboratory. Average temperature and humidity recorded in the laboratory were 27±1°C and 72±5% RH respectively. For this study one pair each of male and female parasite were placed with 10 host pupae in each of five glass vials. Parasites were supplied with 50% honey solution as food.

Preliminary observations indicate that *S. cameroni* is a solitary endopupal parasite. Development from egg to adult took 27–29 days. The adult emerged by cutting a circular hole at the anterior end of the host puparium. Sex ratio, male:female, was 1:2.5. A single female parasitizes 1–2 host pupae. Males lived for 6–7 days while females survived for 9–11 days when provided with 50% honey solution.

P. vindimae is also an endopupal parasite. The life cycle was completed in 24–26 days. From a single pupa 3–4 parasites emerged by cutting 2–3 small holes in the wall of the host puparium. Sex ratio, male:female, was 1:4. A single female parasitizes 2–3 host pupae. Males survived for 8–9 days while females lived for 15–17 days when provided with 50% honey solution.

Studies to evaluate the usefulness of these basically house fly parasite types in biological control of uzi fly and to compare their potential with that of the originally reared parasites of uzi fly are in progress.

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EFFECT OF THE ESSENTIAL OIL FROM THE GUM OLEORESIN OF *BOSWELLIA SERRATA* ROXB. ON THE GONADS OF MALE *DYSDERCUS SIMILIS* F.

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THE role of juvenile hormone (JH) or its analogues in the male reproductive system in insects is not fully understood. However, the effects of JH on testis development and spermatogenesis have been reported in various insects[1,2]. Earlier we have reported JH-mimicking effects (morphological and gonadotrophic)[3] of the gum oleoresin of *Boswellia serrata* on *Dysdercus similis*. In the present communication, the histological derangements in the gonads of male *D. similis* caused by the essential oil of *B. serrata* are reported.

Twenty freshly moulted fifth instar nymphs were taken from stock culture and maintained under controlled conditions at 27±1°C and 70±5% RH. Nymphs were topically applied with *B. serrata* essential oil (1 μl per insect, 1:30 in acetone). The oil has one acyclic monoterpene (myrcene), seven monocyclic monoterpenes (D-α-phellandrene, β-phellandrene, limonene, dipentene, α-terpinene, *p*-cymene and terpinene-4-ol), and five bicyclic monoterpenes (α-pinene, β-pinene, α-tujene, camphene and bornyl acetate). Controls were treated with pure acetone only. Control and treated insects were fed on water-soaked cotton seeds.

Control and treated insects were dissected in insect Ringer's solution. The reproductive organs

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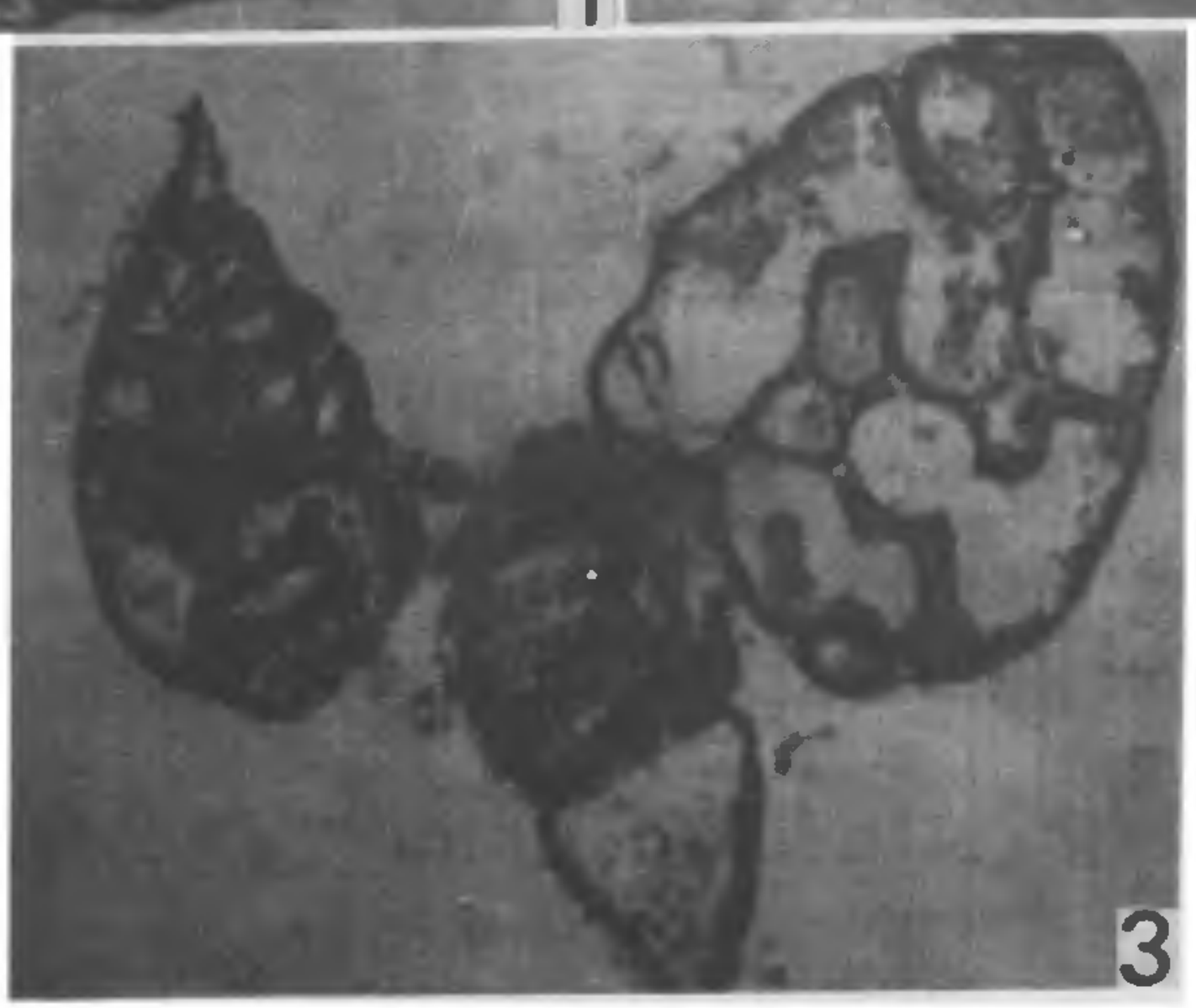

Figures 1–3. **1,** Sagittal section of testis of treated insect showing degenerated spermatogonia. Note the deformed spermatozoa and their irregular and solitary movement (× 200). **2,** Sagittal section of testis of treated insect showing advanced stage of degeneration. No definite follicles are seen. Note the degenerated spermatogonia and abnormal spermatozoa (× 200). **3,** Section of affected accessory glands showing globules with sparsely distributed secretory material (× 150).

were removed, fixed in Bouin's fluid, dehydrated in an alcohol series, cleared in xylene, and embedded in paraffin wax. Sections (6 μm) were processed and stained in Ehrlich's haematoxylin and alcoholic eosin.

Topical application of the essential oil of the gum oleoresin from *B. serrata* on freshly moulted fifth instar nymphs resulted in production of super-nymphs and adult-nymphs. In the resultant forms, both spermatogenesis and spermiogenesis were seriously affected. This was evident from the various abnormalities observed in the testis, vas deferens and accessory glands.

Sagittal sections of testis showed degeneration of testicular tissue. The spermatogonia lost their cysts and the nuclei became pycnotic and large gaps appeared between them (figure 1). The spermatogonial cells and remnants of the necrotic tissue were found in the apical region of the testis. The heads of the spermatozoa were not prominent and the sperm did not form bundles. In the controls the spermatozoa moved in bundles. The entire testis of treated insects appeared less compact. Distal elongation of testicular follicle and proximal bulging of testes lobes (figure 2) were due to the proliferation of spermatogonia and excessive release of sperm respectively. The swelling of the proximal part of the testis, which was often observed, could be due to the inability of the spermatozoa to enter the thin vas deferens. These effects may be due to the effects of the essential oil on neurosecretory processes. Similar abnormalities were reported by Revathy *et al*[4]. The accessory glands were globular, each lobe surrounded by a thin layer of cells having pycnotic nuclei. The lumen was sparsely filled with secretory material (figure 3). The gland showed inhibition of secretory activity, as shown by the decrease in the amount of secretion[5].

The results show that the essential oil from the gum oleoresin of *B. serrata* Roxb. affects spermiogenesis in *D. similis* F., thereby acting as an effective insect growth regulator.

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SIB-MATING AND REPRODUCTIVE STRATEGY OF *GRYON* SP. (HYMENOPTERA: SCELIONIDAE)

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THE search for an effective biocontrol agent against heteropteran insects has often focused on predators and parasitoids and much importance is laid on the egg parasitoids of the family Scelionidae[1–3]. *Gryon* sp. was recorded in India as an effective egg parasitoid of the turpod bug *Clavigralla gibbosa* Spinola[4] and also on the eggs of *Nezara viridula* (Linn)[5]. Apart from *Nezara*, the present study has also recorded this parasitoid from the eggs of *Acrosternum graminea* (Fabricius), a weed-infesting pentatomid. Parasitization by this parasitoid on the eggs of *N. viridula* was 23.24% on an average, while and 35% on *A. graminea*. A comparison of the sex ratios of *Gryon* sp. on these two host eggs, which vary in their number and size, confirms the hypothesis that the sex ratio will decrease with increasing levels of sib-mating[6]. Scelionids appear capable of recognizing eggs parasitized by conspecifics and alter their sex ratio in response to the presence of other wasps.

The present investigation highlights the strategy adopted by the parasitoid in producing a precise sex ratio. A good understanding of these aspects would aid biological control programmes using these scelionids, since the main objective is to maximize the production of mated females and release through laboratory rearing often leads to an increase in the production of males. Eggs of the two hosts were