cessing for microtomy. Infiltrate the agar blocks and re-embed them in paraffin.

8. Section the material, process the slides by customary method and stain them in a suitable schedule. Haupt's adhesive and 3% formalin are effective for (floating and affixing) the paraffin-agar ribbons.

A thin film of agar persists on the slide around the material even after mounting and staining. Being transparent this does not seriously hinder observation or photography. This method is also useful for histochemical investigations.

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PROMOTION OF FEMALE FLOWER FORMATION IN CASTOR BEAN (*RICINUS COMMUNIS* L) BY PHTHALIMIDES

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EXOGENOUSLY applied plant growth regulators are known to affect sex expression in several monoecious and dioecious species[1,2]. Studies have been made on the possible role of gibberellin[3,4], amino acids[5], silver and cobalt ions[6], ethrel and chloroflurenol[7] and peroxidase and its isozymes[8] in sex expression of *Ricinus communis*. Gibberellin, when applied to the plants exogenously, promotes the formation of female flowers in this species[7]. Recently, some substituted phthalimides are reported to possess several growth regulating properties[9,10] and have been found to regulate the sex expression in monoecious and gynoecious cucumber[11,12]. The present work was undertaken to investigate the effect of phthalimides on sex expression in *R. communis* L, a monoecious plant.

Plants of *R. communis* L were raised from seeds in earthen pots filled with properly manured soil. Foliar applications of two derivatives of phthalimide were made upto run-off level to the plants having 12–15 nodes before inflorescence initiation. The plants were sprayed with 125, 250 and 500 mg l^{-1} of 1-(3-chlorophthalimido)-cyclohexanecarboxamide (AC-94377) or 1-(1-cyclohexene-1,2-dicarboximido)-cyclohexanecarboxamide (AC-99524) supplemented with 0.1% triton X-114 as a wetting agent. Plants sprayed with distilled water containing only 0.1% Triton X-114 were considered as control. Second and third applications were made after 7 and 14 days of the first spraying respectively. Each treatment consisted of 6 plants replicated 2 times. The data are expressed as mean value ± S.D.

Phthalimides increased the percentage of female flowers with simultaneous decrease in the percentage of male flowers on the treated plants. The percentage of female flowers increased from 21.2 (control) to 26.4, 34.6 and 28.5 at 125, 250 and 500 mg l^{-1} of AC-94377. The plants treated with AC-99524 also exhibited increased percentage of female flowers which were 24.2, 29.6 and 32.3 at 125, 250 and 500 mg l^{-1} respectively as compared to the control. Male flowers constituted the remaining percentage at each concentration of both the phthalimides. AC-94377 at 250 mg l^{-1} and AC-99524 at 500 mg l^{-1} were most effective for promoting the formation of female flowers (table 1). Overall, AC-94377 was more effective than AC-99524 in inducing femininity in this species. The total number of male and female flowers per plant increased with the increase in the concentration of each phthalimide but the size of male flower buds got reduced in both the cases. At 500 mg l^{-1} of each phthalimide, some male flower buds failed to open, dried and abscissed. Female flowers produced on the treated plants were somewhat thin and elon-

Table 1 *Effect of phthalimides (AC-94377 and AC-99524) on sex expression in Ricinus communis L*

Treatment (mg l^{-1})	Percentage of female flowers ± S.D.	Total No. of flowers per plant mean ± S.D.
Control	21.2 ± 2.4	42.6 ± 10.2
AC-94377		
125	26.4 ± 2.9	53.2 ± 8 3
250	34.6 ± 3.8	59.0 ± 11 4
500	28.5 ± 3.3	64.3 ± 9.0
AC-99524		
125	24.2 ± 2.5	50.8 ± 8.0
250	29.6 ± 3.5	58.3 ± 6.7
500	32.3 ± 4.1	64.0 ± 12 3

gated especially at higher concentration (*i.e.* 500 mg l^{-1}) of each phthalimide.

Gibberellins have been found to be associated with masculinity in several plants[13]. However, in *Ricinus*, the findings of Kumar[7] have demonstrated the enhancement of female flower production by gibberellin which are in conformity with the previous findings of Shifriss[3]. Gibberellin has also been found to promote femininity in other plants as well[14]. It is likely that phthalimides, as reported in cucurbits, act like gibberellin and promote femininity in *R. communis*.

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UPPER LIMIT OF TEMPERATURE FOR THE DEVELOPMENT OF *OOENCYRTUS PAPILIONIS* ASHMEAD WITHIN ITS HOST EGGS

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THE role of the egg parasitoid *Ooencyrtus papilionis* Ashmead, in regulating the natural population of the sugarcane leaf hopper, (*Pyrilla perpusilla* Walker) in sugarcane belts of this country, has been discussed by many workers[1-4]. The present authors determined the relative performances of this parasitoid over a wide range of temperatures in the laboratory and found the mean temperature around 27.5 ± 1.5°C to be optimal for its reproduction and development. In the present study, attempts were made to determine the upper limit of temperature for embryonic and post-embryonic development of *O. papilionis*.

To meet the experimental requirements, cultures of both host and parasitoid were maintained in the laboratory. Freshly emerged parasitoid adults were released at the rate of 20 pairs per rearing glass tube (10 × 3.75 cm). Five such tubes were prepared and placed at 27.5 ± 1.5°C in a B. O. D. incubator. The adults in each rearing tube were fed on 10% sucrose in water. Five egg-cards, each bearing about 100 fresh host eggs were exposed to parasitoid females, providing one egg-card in each tube. Egg-cards were replaced every 24 hr until all the females died. The egg-cards, were then transferred to test temperatures *viz* 30, 32.5 and 35 ± 1.5°C after 1, 2, 4, 6 and 8 days of parasitization from tubes 1 to 5, respectively. In all cases, the number of eggs displaying symptoms of parasitization, duration of life cycle and the number of male and female parasitoids emerged were recorded and the data are summarised in table 1.

The average number of parasitized host eggs/female at various temperatures remained more or less similar to that at the normal temperature *i.e.* 27.5 ± 1.5°C. In host eggs, shifted to 35 ± 1.5°C after parasitization, minute black spots were visible but there was no parasitoid emergence from them. The developmental duration did not vary much at different test temperatures. It was, however, reduced by about 1 and 2 days at 30 and 32 ± 1.5 C, respectively, when one-day old parasitized host eggs were placed at these temperatures. The adverse effect of temperature above 27.5