

INTRASPECIFIC VARIATIONS IN DIGENETIC TREMATODES  
III. *PLEUROGENOIDES GASTROPORUS* (LÜHE, 1901)  
(FAMILY LECITHODENDRIIDAE)

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ABSTRACT

Intraspecific variations in *Pleurogenoides gastroporus* (Lühe, 1901) have been studied. The effect of comparatively faster growth of posterior part containing uterus has been studied. The development of uterus causes displacement and compactness of various organs. *Pleurogenoides (Telogonella) sawanensis* (N. K. Gupta, 1954), *Pleurogenoides orientalis* (Srivastava, 1934) and *P. gastroporus* var. *equalis* (Mehra and Negi, 1928) are considered synonyms of *Pleurogenoides gastroporus* (Lühe, 1901).

The importance of intraspecific variations in assessing the validity of taxa of specific and infraspecific levels is well-known to workers on systematic zoology. This author has earlier studied intraspecific variations in *Ganeo tigrinum* (Gupta, 1977) and *Pleurogenoides sitapurii* (Gupta, *in press*). The earlier two papers and the present one indicate that the subject of intraspecific variations is not limited only to the dictionary meaning of this word. It leads us to next logical stage of studying the trends of variations in a species as a result of growth of individuals in a population. The three papers of this author show beyond doubt that at least the development of uterus sets in a trend of displacement and compactness of various organs and relatively faster growth of posterior part containing uterine coils in these species of digenetic trematodes. It could be expected that more studies on these lines will reveal some other factors governing the trends of

intraspecific variations in different species of trematodes.

In the present paper intraspecific variations in *Pleurogenoides gastroporus* (Lühe, 1901) have been studied and validity of a few species examined in the light of variations observed.

Intraspecific variations in *Pleurogenoides gastroporus* (Lühe, 1901) : (Fig. 1)

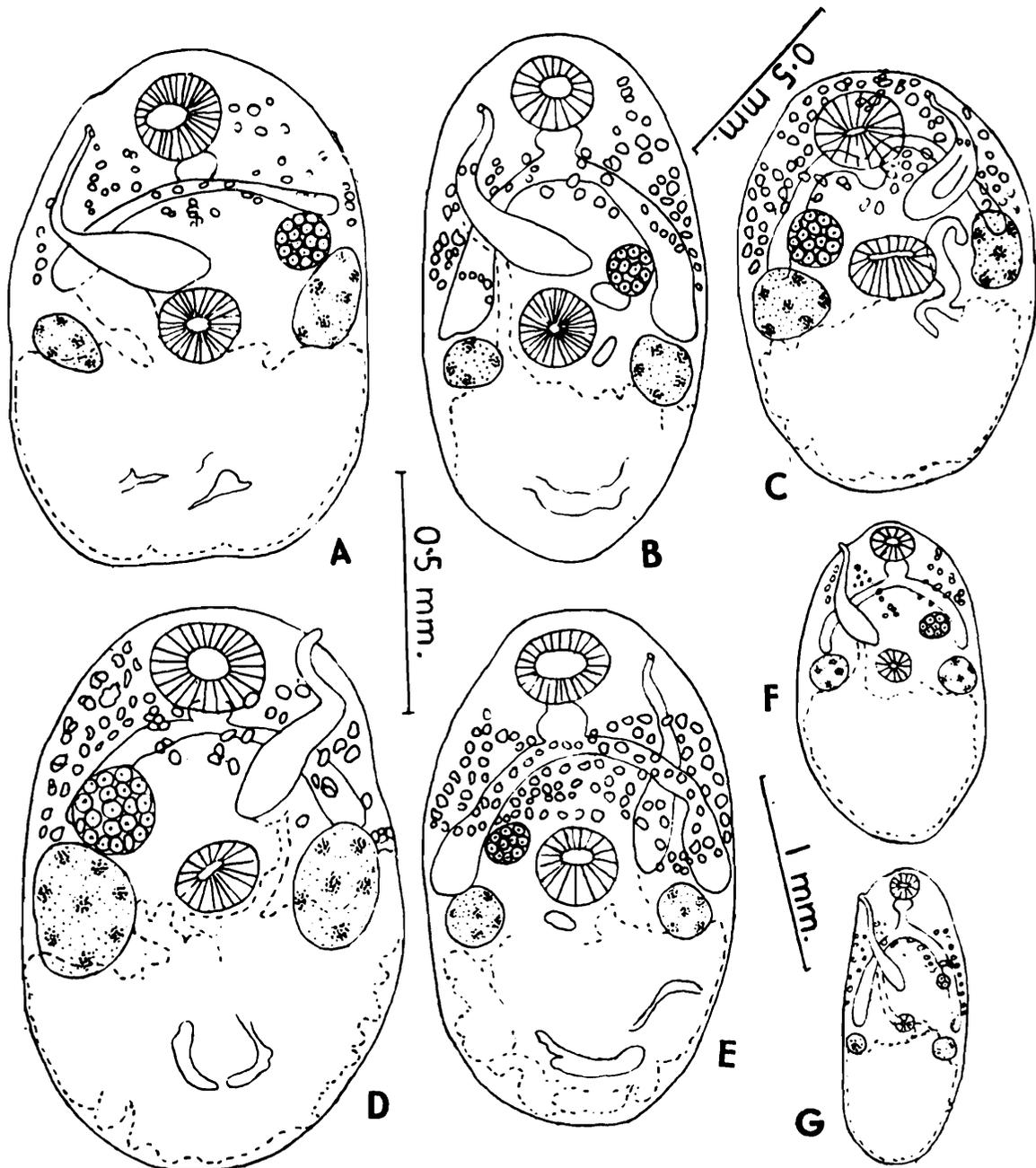
*Pleurogenoides gastroporus* (Syn. *Pleurogenes gastroporus* Lühe, 1901) is known only from India. Mukherjee and Ghosh (1970) recorded variation of some characters of this species. A total of 80 worms of this species measuring 0.72-2.02 mm. were collected from frogs in the vicinity of Poona. This material consisted of only mature specimens. In all 30 characters concerning 12 main features of body have been studied. Unless absolutely necessary, measurements of organs have not

been given. They have been studied in relation to one another.

**Cuticular spines:** They are generally visible in anterior part of body to the level of posterior margin of testes. On careful examination some specimens show presence of spines throughout the body. In the ante-

rior part they are closely situated, posteriorly they become sparser.

**Oral sucker:** It is mostly spherical; some specimens have transversely elongated oral sucker. It is subterminal or terminal in position and larger than the ventral sucker. Ratio of the size of oral and ventral suckers is



Figs. 1 (A-G). Showing intraspecific variations in *Pleurogenoides gastroporus* (Lühe, 1901)

6 : 5 or 5 : 4. In one case it is smaller than the ventral sucker.

*Ventral sucker* : Its position is pre-equatorial, equatorial or post-equatorial. Shape of ventral sucker is generally round, sometimes elongated transversely or antero-posteriorly. It is generally situated with its centrum in level with the space between ovary and testes. Posteriorly it extends behind testes or lies entirely in the testicular zone. Its anterior border varies from the level of the middle part of ovary to middle part of testis. Sometimes it reaches the anterior border of the ovary. The acetabulum is situated entirely in the caecal zone, partly in caecal and partly in postcaecal area or completely behind caeca.

*Oesophagus* : Generally, it is absent but oesophagus measuring a maximum of 0.058 mm is found. Worms showing oesophagus have vitelline follicles much behind middle of oral sucker. Excepting one case, forms with longer oesophagus have some space between ovary and testes.

*Intestinal caeca* : Some forms have widely separating short caeca which run almost straight to lateral field. Other specimens have gradually separating longer caeca. In some cases caeca terminate in front of testes, in first-third of body length. In other cases they reach the equatorial plane, about middle of testes. Widely separating caeca terminate much anterior to ventral sucker. In other cases they reach centrum of acetabulum and in still rare cases they are either reaching posterior extremity of ventral sucker or slightly beyond, approaching the condition of *Pleurogenoides (Telogonella) sawanensis*. Posterior termination of caeca is rounded, pointed

or notched to receive anterior margin of testis. In some cases they have uniform diameter, whereas in others the distal part is distended irrespective of the shape of its termination.

*Ovary* : It is generally spherical, sometimes subglobular, roughly triangular or elongated. The ovary is situated antero-lateral to ventral sucker. In one case it is entirely lateral to acetabulum, with its anterior border in level with that of acetabulum. Generally ovary is in intracaecal field, occasionally partly covered by caeca. In some cases ovary is situated close to body wall, behind caecum and in front of testis. One specimen has ovary partly outside and lateral to caeca. Position of ovary varies from anterior to posterior portion of second quarter of body length. It is smaller or rarely larger than ventral sucker. Its size varies from half to almost equal to that of testis.

*Testes* : They are spherical, subglobular, roughly triangular, elongated or reniform. Anterior border of testes lies from slightly in front of the anterior margin of the ventral sucker to slightly behind its centrum. Testes are mostly equal, sometimes unequal in size. They are in the same level but rarely one testis is slightly behind the other. They are situated close to caeca, or some distance behind them, or half in the intracaecal field. Anterior margin of testes is slightly pre-equatorial, equatorial or post-equatorial.

*Cirrus sac* : It is club- or retort-shaped with a long, narrow, anterior neck part which is straight, curved or sigmoid and the posterior broad part containing vesicula seminalis and pars prostatica. Posterior extension of cirrus sac varies from just in front of acetabulum to

its centrum. When the cirrus sac is straight it is submedian in position. It bends gradually or abruptly at the level of intestinal bifurcation. In some individuals the posterior end of cirrus sac reaches the median plane in front of acetabulum. In relation to the ovary its posterior extension varies from half the length of ovary to behind it. In relation to the testis of its side, the cirrus sac terminates in front of testis or reaches half its length. Even in the case of bent cirrus sac, its posterior extension shows some variation in relation to the testis of its side.

*Genital pore* : The genital pore is marginal, generally situated in level with middle length of oral sucker. In extreme cases it lies in level with the third quarter of oral sucker. Genital papilla may be present or absent.

*Vitelline follicles* : Anterior and posterior distribution as well as arrangement of vitelline follicles show great variability. Anterior commencement of vitelline follicles varies from in front of oral sucker to behind the pharynx. This range of variation is seen even in the worms collected from the same individual host. Most of the specimens show commencement of vitelline follicles from middle of oral sucker, hence it should be treated as normal condition for *Pleurogenoides gastroporus*. The posterior extension of the vitelline follicles varies from anterior to posterior border of acetabulum, normal position being the level of its centrum. Mostly vitellaria reach posterior end of caeca but sometimes they terminate some distance in front of distal end of caeca. The arrangement of vitelline follicles shows great variation as continuous band, 'M' or 'W' shaped. A few specimens have vitelline follicles in two lateral groups. The posterior distribution of vitellaria

is not correlated with their anterior distribution.

*Uterus* : The uterine coils occupy from less than one-third to slightly more than half of the body length. In a specimen one arm of uterine coils projects between testis and body wall (Fig. 4) as in the case of *Pleurogenoides sitapurii*. However, in this case the projecting arm does not extend in the pre-testicular field. The specimen reported by Mukherjee and Ghosh (1970) apparently represents a more advanced stage of growth of uterus. In the present series the development of uterus does not show any correlation with gradual or wide separation of caeca. The observation of Mukherjee and Ghosh (1970) that the massive growth of uterus causes anterior displacement of ventral sucker, ovary and testes, is in conformity with the view expressed by this author elsewhere (Gupta, 1977 and *in press*) in the case of *Ganeo tigrinum* and *Pleurogenoides sitapurii*. Apart from the fact that growth of uterus causes some displacement and compacting of various organs, another fact has been pointed out in the case of *Tremiorchis ranarum* by Ali and Karyakarte (1970) and *Ganeo tigrinum* and in *Pleurogenoides sitapurii* (Gupta, 1977 and *in press*) that post-testicular part of these worms shows a faster growth rate than the anterior part during the attainment of maturity and gravid stages. This differential growth rate of uterine and gonadal parts of body affects the relative position and size of different organs in relation to body length as well as compared to one another.

#### DISCUSSION

N. K. Gupta (1954) described *Pleurogenoides (Telogonella) sawanensis* on the basis of two

worms in early stage of maturity, collected from intestine of *Rana cyanophlyctis* at Hoshiarpur. This species was distinguished from other species mainly on the basis of its caeca extending behind ventral sucker. *P. (T.) sawanensis* was distinguished from *P. orientalis* (Srivastava, 1934) on the basis of asymmetrical testes, position of ovary and extension of cirrus sac. The position of ovary towards median plane, curved shape of cirrus sac with its distal end reaching median part of body and the middle portion of ventral sucker, caeca reaching posterior margin of acetabulum, and position of genital pore have been described above as individual variations. While dealing with the uterus, the effect of differential growth of the posterior uterine part of these worms and displacement and compacting of other organs has been discussed above. *Pleurogenoides (Telogonella) sawanensis* is in the earlier stage of maturity, showing some differences from fully mature worms described as *Pleurogenoides gastroporus*. Therefore *P. (T.) sawanensis* should be treated as a synonym of *P. gastroporus*.

Srivastava (1934) described *Pleurogenoides orientalis* and distinguished it from *P. gastroporus* and *P. gastroporus* var. *equalis* on the basis of relative position and size ratio of suckers, absence of oesophagus, relative length of caeca, shape and disposition of vitellaria, topography of gonads, shape and position of cirrus sac and position of genital pore. *P. orientalis* comes in the range of variation of these characters described above, hence it should be treated identical with *P. gastroporus*.

*Pleurogenoides gastroporus* var. *equalis* Mehra and Negi (1928) was dropped by Bhalerao (1936) and Singh (1954). This author agrees with them in suppressing var. *equalis*.

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