

diapause for 20 days without food were mated, 75 eggs were obtained per female (Table I). It is interesting to note that the larvae utilized for obtaining such adults weighed much less than the normal ones. It appears from the foregoing account that accumulated food in adults derived from larvae in diapause is not the main factor involved in the observed enhanced fecundity. However, according to an earlier observation, the fecundity recorded from the adults derived from extremely starved larvae in diapause was less than the normal adults but Karnavar⁶ accounted the occurrence of this fecundity to be due to involvement of factors other than the food in the enhanced fecundity due to diapause. Thus the weight of the adults is not apparently very important for the increased fecundity. Obviously, it is the development with or without food, which is responsible for this increase. This is supported by the fact that larvae spending more time in diapause need much less exposure to diapause terminating conditions for coming out of diapause¹¹.

Fecundity was above 70 eggs per female when the female adults developed from either types of larvae in diapause were crossed with normal males, whereas, 55 to 56 eggs per female were laid when the adult males developed from either types of larvae in diapause were allowed to mate with normal females (Table I). These results show that the female is relatively more involved in the enhanced fecundity. There was not much effect of diapause on per cent hatchability as more than 94% of eggs laid hatched in all crosses (Table I).

The enhancement of the reproductive potential in *T. granarium* as a result of diapause not only protects the pest from the adverse environmental conditions, but also adds extra potential for multiplication of its population under favourable conditions.

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CLASTOGENICITY OF ESTRONE IN THE RAT BONE-MARROW CELLS

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It has been known for some time that the removal of the ovaries in mice at an early age prevents the onset of mammary tumours in the susceptible inbred strains. The estrogenic hormones have been demonstrated to be carcinogenic¹. One such hormone is estrone which controls the uterine cycle. It was first isolated from the urine of pregnant women. This steroid hormone, responsible for inhibition or stimulation of the specific tissue growth, has also been found to be teratogenic. The present studies were undertaken to study its clastogenic effect on the bone-marrow chromosomes of the white rat—*Rattus norvegicus*.

Different series of rats were injected intraperitoneally with multiple doses of 10 mg/kg body weight of estrone every 24 hours. All the doses were less than LD50. With each series was a control which was injected only with distilled water. The animals were sacrificed after 24, 48 and 72 hours. Chromosomal preparations from the bone-marrow were made according to the air-drying technique. In addition, the DNA content of the liver and spleen was estimated according to the colorimetric method, using the diphenylamine reaction.

The frequency of aberrations in the control animals did not exceed 3% and the aberrations were mainly the hypodiploid cells, but sometimes gaps were also encountered. On examining the chromosomal preparations of the treated animals, aberrations of both the numerical and structural types were observed. A number of polyploid cells were observed and the structural aberrations consisted of gaps, breaks (chromatid and multiple types), translocation and pulverization. A dicentric and three ring chromosomes were also observed with the highest dose. The total number of aberrations increased with an increase in the dose. The mitotic index in all the cases was quite high and it also showed an increase with an

TABLE I
Alterations in the nuclear contents of rat with estrone

Dose	Duration (hr)	Total % of aberrations	Mitotic index	DNA content (mg/g)	
				Liver	Spleen
10 mg/kg	24	46	2.05	0.75	1.29
20 mg/kg (10 mg/24 hr)	48	50.7	2.29	0.75	1.37
30 mg/kg (10 mg/24 hr)	72	55.7	3.33	0.79	1.37

increase in the dose. This was in relation to an increase in the quantity of DNA in the liver and spleen (Table I), showing that estrone is a cell prolific agent.

Although the chromosomal aberrations were found in many cells, their type and extent varied from cell to cell even in the same individual. The gaps and breaks were randomly distributed and no particular chromosome was affected. These aberrations were of the chromatid type showing that most probably the damage to the chromosomes occurred, while they were in the G_2 phase.

The induction of small chromosomal deletions or translocations results in significant changes in neoplastic initiation. These rarely arise as a result of direct damage to DNA, but are mainly due to indirect disturbances in chromosome synthesis. The analysis of chromosomes can, therefore, be one of the means for screening cancer.

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ON A RARE TREMATODE, *TRANSVERSOTREMA CHAUHANI* N.SP., FROM A FRESHWATER FISH, *NANDUS NANDUS* (HAM.)

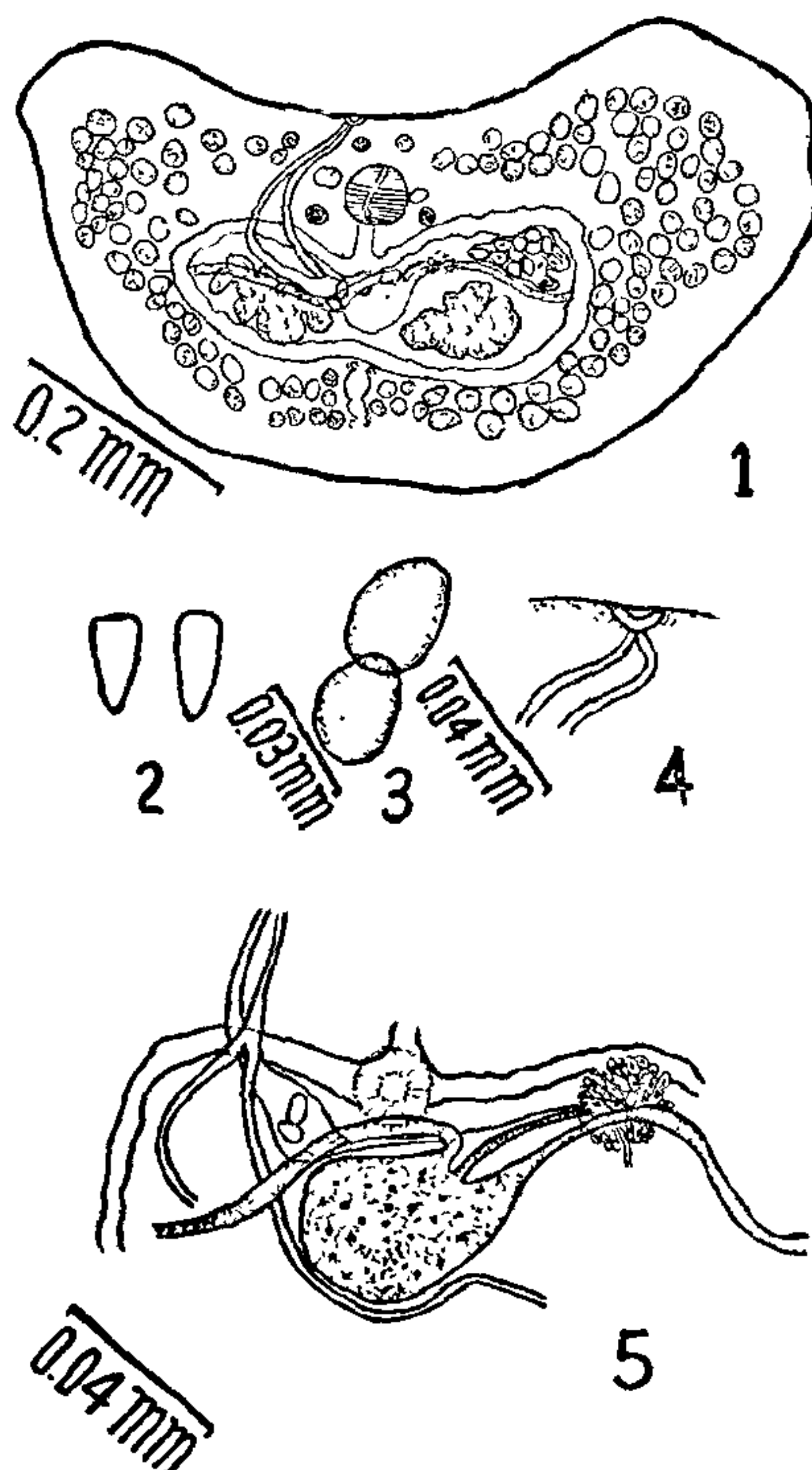
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Transversotrema chauhani n.sp.

Host: *Nandus nandus* (Ham.); Host examined: 220; Host infected: 1; specimens collected: 2; Locality: Lucknow.

Body flattened, transversely elongated, concave anterior margin, spinose, spines triangular and equal, 0.30-0.44 × 0.64-0.71 mm. Eye spots, one pair,

black, round, at the level of pharynx, 0.01 mm. Oral sucker absent. Pharynx subterminal, spherical, 0.04-0.05 × 0.05-0.06 mm. Oesophagus short, 0.03-



FIGS. 1-5. Fig. 1. *Transversotrema chauhani* n.sp. Fig. 2. Body spines enlarged. Fig. 3. Eggs. Fig. 4. Portion of body enlarged showing genital aperture. Fig. 5. Portion of body enlarged showing ootype complex, vitelline reservoir and portion of uterus.