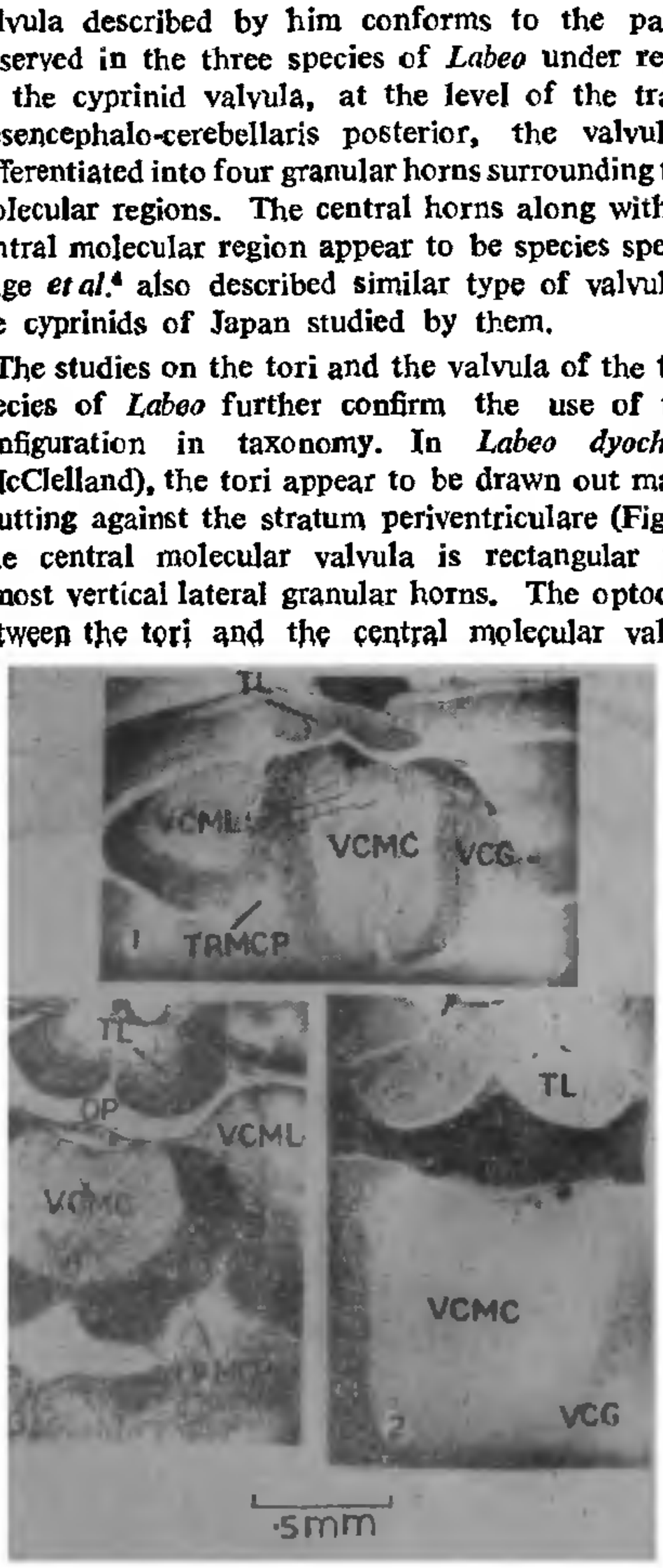
TORI LONGITUDINALES AND VALVULA CEREBELLI IN THREE SPECIES OF *LABEO*

TANDON[2], Tandon and Kaur[3] described the importance of the configuration of tori longitudinales and valvula cerebelli as an additional parameter in the taxonomy of bony fishes. Banarescu[1] described different types of valvulae in bony fishes. The cyprinid type of valvula described by him conforms to the pattern observed in the three species of *Labeo* under report. In the cyprinid valvula, at the level of the tractus mesencephalo-cerebellaris posterior, the valvula is differentiated into four granular horns surrounding three molecular regions. The central horns along with the central molecular region appear to be species specific. Tuge *et al.*[4] also described similar type of valvula in the cyprinids of Japan studied by them.

The studies on the tori and the valvula of the three species of *Labeo* further confirm the use of their configuration in taxonomy. In *Labeo dyocheilus* (McClelland), the tori appear to be drawn out masses abutting against the stratum periventriculare (Fig. 1). The central molecular valvula is rectangular with almost vertical lateral granular horns. The optocoele between the tori and the central molecular valvula is narrow. In *L. dero* (Ham.) the tori are bean-shaped and the optocoele between the tori and the central molecular valvula is spacious. The central molecular valvula has oblique lateral sides with granular valvula (Fig. 2). In *L. rohita* (Ham.), the tori are like small paper bags and the optocoele between the tori and the central molecular valvula cerebelli, though wide, is not as spacious as in *L. dero*. The central molecular valvula is almost circular surrounded by half moon-shaped granular valvula on the lateral sides (Fig. 3). Thus the configuration of the tori longitudinales and the valvula cerebelli may be of significant value as the species specific character.



FIGS. 1–3. T.S. mesial sections of mesencephalou of *Labeo dyocheilus*, *L. dero* and *L. rohita* respectively. OP=Optocoele, TL=Torus longitudinalis, TRMCP=Tractus mesencephalo-cerebellaris posterior, VCG=granular valvula cerebelli, VCMC=Central molecular valvula cerebelli, VCML=Lateral molecular valvula cerebelli.

Department of Zoology,
Panjab University,
Chandigarh,
December 13, 1979.

K. K. TANDON.
KIRANJIT KAUR.

1. Banarescu, P., *Revue de Biologie*, 1957, **2**, 255.
2. Tandon, K. K., *Curr. Sci.*, 1978, **47**, 600.
3. — and Kaur, P, *Ibid.*, 1979, **48**, 511.
4. Tuge, H., Uchihashi, K. and Shimamura, H., *An Atlas of the Brains of Fishes of Japan*, Tsukijishokan Publishing Co. Ltd., Tokyo, Japan, 1968, p. 1.

SEROLOGICAL EVIDENCE OF LEPTOSEIRAL ANTIBODIES IN MAN IN AND AROUND BANGALORE

LEPTOSPIROSIS is one of the world-wide zoonoses. Leptospires are widely distributed in nature and give rise to a variety of infections in man and animals, ranging from severe and fatal disease to symptomless carrier state. The disease is transmitted to man, generally indirectly, from small rodents and other animals which harbour leptospires in their kidneys and excrete the organisms in the urine.

There is no information regarding the incidence of this infection among human beings in Karnataka State. The present study in man, in and around Bangalore City was undertaken as a preliminary survey for serological evidence of leptospiral antibodies.

Materials and Methods

The serum samples were provided by the Department of Microbiology, St. John's Medical College, Bangalore. Out of 337 samples included in this study, 61 samples were collected from patients attending the hospital, 239 from apparently healthy villagers and 37 from the Dairy workers and veterinarians.

All the serum samples were subjected to microscopic agglutination lysis test, as recommended by WHO/FAO Leptospirosis laboratories, using live leptospira cultures as antigens[1]. The following six serotypes were used for the test: *L. andamana*, *L. valbuzzi*, *L. hurstbridge*,

L. icterohaemorrhagiae, *L. canicola* and *L. pomona*. The serum was diluted in sterile phosphate buffered saline (pH 7·4) to give a dilution of 1 : 50. To each 0·2 ml of the diluted serum in a clean well of a perspex plate, was added an equal quantity of 7–10 day old well-grown live leptospira culture (in EMJH* liquid medium) of each of the 6 serotypes mentioned above to provide a final dilution of 1 : 100. The plate was shaken well and incubated at 30° C for 3 hr, after which, it was examined under dark field microscope for agglutination, and lysis. When 75% or more of the leptospires were agglutinated or lysed, it was taken as positive reaction. A titre of 1:100 was taken as positive.

The data are presented in Tables I and II. Thirteen of 239 samples collected from villagers showed positive reaction and one sample showed positive reaction to two serotypes, *viz.*, *L. valbuzzi* and *L. andaman*. Of the 37 samples from the workers of organised dairy farm and veterinarians, 2 showed positive reaction.

TABLE I

Serological evidence of leptospiral infection in different groups of people

Source	No. tested	No. positive	Per cent positive
1. Rural areas	239	13	5·4
2. Dairy workers and veterinarians	37	2	5·4
3. Hospital samples (urban)	61	1	1·6
Total samples tested	337	16	4·75

TABLE II

Sera positive for different leptospiral serotypes tested

Serotype used	No. of sera positive
1. *L. andaman*	6
2. *L. valbuzzi*	4
3. *L. bataviae*	3
4. *L. icterohaemorrhagiae*	2
5. *L. canicola*	2
6. *L. pomona*	1
Total	18

Note : Two serum samples had antibodies for 2 or 3 serotypes.

One sample from a veterinarian with the history of non-specific fever showed positive reaction to 3 serotypes, *viz.*, *L. icterohaemorrhagiae*, *L. canicola* and *L. valbuzzi*. Sixtyone samples from human patients, with history of pyrexia, were screened and only one showed positive reaction. The overall incidence was 4·75% (Table I). The incidence of different serotypes was in the following order (Table II): *L. andaman* (6), *L. valbuzzi* (4), *L. bataviae* (3), *L. cancila* (2), *L. icterohaemorrhagiae* (2) and *L. pomona* (1).

The present study has revealed serological evidence of leptospiral antibodies in human beings in the State of Karnataka. Since leptospirosis in human beings is associated with certain occupations, in this study, the serum samples were collected from people with different occupations to know the incidence of the disease in these groups. The highest proportion of incidence (5·4%) was observed among agricultural workers, dairymen and veterinarians who frequently come in contact with the causative agent while carrying out field operations. Among this group one sample from a veterinarian showed the positive reaction against three serotypes which might probably be a mixed infection or a cross reaction. Evidence of leptospiral antibodies in man has been reported by other workers from different parts of India[2–4]. Direct and indirect exposure through animal source, contaminated soil and water samples has been reported to be common.

In the third occupational group of city dwellers, the incidence was comparatively low (1·6%). The low incidence of this group might be due to the low exposure of this population to the infective material[5]. However, incidence in city population has also been reported from pet lovers, slaughter house workers and others swimming in ponds containing infected water.

Incidence of antibodies against serotype, Andaman was observed to be higher compared to other serotypes (Table II). This finding may be correlated with the isolation of Andaman serotype from animal source in this laboratory (unpublished data).

Attempts to isolate leptospires from a few of the positive cases were also made but results were not encouraging. The paucity of isolations was more directly related to failure to obtain suitable specimens than to any difficulty in isolating the organisms.

The public health aspect of leptospirosis is of great importance because of large livestock and rodent population, poor sanitary and animal management practices and intimate human association with animals, particularly in rural areas. Human leptospirosis with reference to occupational groups deserves to be studied on a wider scale.

Department of Veterinary Microbiology and Public Health,
University of Agricultural Sciences,
Hebbal, Bangalore 560 024,
January 22, 1980.

G. KRISHNAPPA.
A. S. UPADHYE.
NAVEED AHMED.
B. S. KESHAVAMURTHY.
MRS. P. BHAT.**

* EMJH medium: Difco Lab., Detroit, Michigan, USA.

** Department of Microbiology, St. John's Medical College, Bangalore.

1. "Current problems in leptospirosis research. Report of WHO Expert group," *Technical Report Series No.* 380, 1967.
2. Ball, M. G. and Shaik, U., "Survey of leptospirosis in Bombay," *Amer. J. Hyg.*, 1958, **67**, 66.
3. Joseph, K. M. and Kavita, S. L., "Leptospirosis in India," *Indian Med. Res.*, 1966, **54**, 611.
4. Iyer, L. S., Sant, M. V., "Leptospirosis in man and animals," *Bull. Ind. Soc. Mal. Com. dis.*, 1968, **5**, 235.
5. Johnson, R. C., *The Biology of Parasitic Spirochetes*, Academic Press, New York, 1976.

BIMODAL GAS EXCHANGE AND SOME BLOOD PARAMETERS IN THE INDIAN AIR-BREATHING FISH, *OSPHROMENUS OLFAX* (DAY)

Osphromenus olfax is an exotic species introduced in Madras in 1886. Its air-breathing habit was first mentioned by Day[1]. No information is available on the respiratory patterns and blood parameters of this fish. An attempt has been made to study the bimodal gas exchange and respiratory adaptations of the blood in *O. olfax* and the results are reported here.

O. olfax weighing 10 to 15 g were collected from local fresh water sources and acclimated to the laboratory conditions for 10 days at 28 ± 1° C. The fishes were fed every other day and water in the aquaria was renewed once a week. Feeding was stopped a day before the fishes were used in the experiments. Each fish was transferred from the acclimation tank to the respirometer at least 12 h before the experiment and kept in running water overnight. The oxygen consumption of the fish in air was measured with a simple respirometer using manometric techniques (Umbreit *et al.*[14]). The oxygen consumption with no access to air was studied using the method of Job[3]. The aerial and aquatic respirations were measured when fishes were in water with access to air using the apparatus described in an earlier publication[8]. Oxygen consumption from water was found by estimating the loss of oxygen using Winkler's method (Welsh and Smith[16]) and oxygen consumed

TABLE I

Oxygen consumption of O. olfax (*cc/kg/h* ± *S.E.*)
N = 20

Oxygen consumption	Water	Air	Total oxygen consumption
From air	..	148·40 ± 4·66	..
From water with access to air	68·10 ± 3·72 (31%)	152·30 ± 5·20 (69%)	220·40 ± 8·46
From water without access to air	74·68 ± 3·80	..	..

TABLE II

Blood characteristics

Blood parameters	Male + female	Male	Female
Haemoglobin (Hb) (gm%)	16·60 ± 0·782	17·80 ± 1·020	15·87 ± 0·670
Mean corpuscular haemoglobin concentration (MCHC) (%)	30·20 ± 1·20	31·06 ± 1·16	29·64 ± 1·30
Haematocrit (Hct) (%)	48·6 ± 1·28	48·60 ± 1·34	46·82 ± 0·932
Oxygen capacity (Vol %)	17·32 ± 0·575	18·82 ± 0·463	16·30 ± 0·394
Red blood corpuscle (RBC) ($\times 10^6$ m/c mm)	3·20 ± 0·630	3·40 ± 0·542	2·70 ± 0·460
Standard bicarbonates (mM/l) pH = 7·60	34·20 ± 1·40	35·52 ± 1·20	33·80 ± 1·00

Values expressed are mean ± S.D. for 6 individual observations.