Table 1 *Comparative data of the normal and abnormal fish*

Parts of olfactory system	Normal fish	Abnormal fish
Number of olfactory organ	2	1
Number of olfactory nerve	2	1
Number of olfactory lobe in the telencephalon of brain	2	1
Length of raphe (mm)	6	8
Number of lamellae in each rosette (pairs)	18	32
Total number of lamellae in each fish	72	64

(figures 1 and 3) have been worked out by earlier workers. Table 1 and figures 1–6 present brief comparative data of the normal and the abnormal fish.

In abnormal fish prenasal and internasal distances are lacking. It has a single olfactory organ occupying the middle region of head between the eyes (figure 2). The nasal opening is single and large. It is highly complicated with a tetralobular outline, about 76 mm/9 mm in their maximum length and height respectively. The nasal flap and nasal curtain are entirely absent. The olfactory rosette is oval in shape and almost completely exposed. The raphe is about 8 mm in length with 32 pairs of well-developed lamellae. Single thick olfactory nerve connects the olfactory rosette to the olfactory lobe of the brain (table 1). X-ray photograph reveals the degeneration of ethomoidal, nasal and also the lachrymal bones. The maxillaries, dentary and mandibular are more angular in shape. The jaws are reduced in size and shifted ventrally (figures 4 and 6).

The presence of a single olfactory organ is unusual and could have arisen by accident or genetic mutations. It is also possible that the heavy pollution of the Hussainsagar lake[3], is responsible for the deformation in the fish. Another possible reason for the abnormality could be the development of a single (instead of paired) olfactory lobe from the anteroventral part of telencephalon of the brain during embryonic development. The loss of one complete set of olfactory organ is compensated by developing almost the same number of total olfactory lamellae as in the normal fish. The abnormality does not appear to have affected the sense of olfaction as revealed by the well-developed olfactory rosette and their doubling in the number of lamellae.

The authors thank Prof. V. Jagannath Rao for guidance. One of us (SKJ) thanks CSIR, New Delhi for financial assistance.

21 July 1987; Revised 17 December 1987

1. Sinha, R. K., Singh, S. P. and Singh, S. B., *Matsya*, 1982, **8**, 7.
2. Jaiswal, S. K., Radha, K. and Waghray, S., *J. Biol. Sci. Res.*, 1988, (in press).
3. Babu Rao, M. and Reddy, S., *Geobios. News Rep.*, 1983, **2**, 171.

GILL SURFACE AREA OF A GIANT SIZE (WEIGHT 17 KG) RIVERINE SPECIMEN OF MAJOR CARP, *CATLA CATLA* (HAM)

G. K. KUNWAR and J. S. DATTA MUNSHI
Department of Zoology, Bhagalpur University, Bhagalpur 812 007, India.

Catla catla is the fastest growing food fish of India[1]. Its natural habitat is the river but it is popular among the fish farmers as it grows quite well in ponds, lakes and reservoirs. The growth rate varies according to its ecological conditions[2]. Natarajan and Jhingran[3] determined the age and growth of *Catla* from its scales. They could develop growth equation for the species as $\log w = 6.44009 + 3.28325 \log L$ (SE $\pm$ 0.00755). The estimated weight of a 5-year-old fish is 14.6 kg.

The present paper deals with the measurements of gill surface area of a giant specimen (17 kg) *Catla catla* collected from its natural environment. The data are compared with a 17 g fingerling of the same habitat. The result throws light on the growth patterns among different parameters of gills of *Catla* as it grows in its natural environment of Ganga river.

The specimens were collected from the river Ganges by drag net. After taking the fresh weight of the fish, the opercula were removed and the entire head and gills were immediately fixed and preserved in Bouin's solution. The gill area was estimated according to Hughes and Morgan[4]. All the measurements were made under dissecting binocular microscope and ermascope.

The various parameters of the gill sieve of 17 g and 17 kg fishes are given in table 1. *Catla catla* has four pairs of gill arches, the first three were almost equal in size bearing almost the same number of filaments. The fourth gill arch was the smallest with minimum number of filaments.