

Figure 1A-G. *Russula crustosa* Peck: A. Basidiocarps with longitudinal section; B. Basidiospores; C. Basidia; D. Pleurocystidia; E. Cheilocystidia; F. Cross section through pileus showing cuticle (part), and G. Pileus context (part).

the stipe, acute in front, yellowish white; edges entire. Stipe 4–9 cm long and 1.0–2.5 cm diam, central, cylindric equal in diam throughout or tapering slightly towards the base, dry, glabrous, stuffed, white to yellowish white. Spore colour in mass yellowish white. Spores 5.5–8.0 (–9.6) × 4.8–6.4 (–7.0) μm, usually broadly ellipsoid to obovate, occasionally elliptic, reniform, pip-shaped or subglobose; ornamentation 0.3–0.8 (–1) μm high, of convex to conic warts and a few connectives forming a partial to nearly a complete reticulum; apiculus 0.8–1.5 μm long. Basidia 30–52 × 7.0–11.2 μm, clavate, tetrasporic; sterigmata up to 6.5 μm long. Pleurocystidia 36–82 × 5–9 μm, subcylindric, clavate, fusoid-clavate or fusiform; abundant. Cheilocystidia 36–70 × 5.0–8.5 μm, subcylindric, clavate or fusoid. Subhymenium 20–42 μm thick, pseudoparenchymatous. Pileus subcutis 80–350 μm thick, consisting of horizontally oriented, interwoven, non-gelatinous hyphae, 1.5–5.0 μm diam whereas the epicutis 50–120 μm thick, of ascending to erect, non-gelatinous

hyphae with lower cells inflated, 5–20 μm diam and the free ends slender to short cylindric, clavate, lanceolate and tapered apically. Hymenophoral trama, pileus context and stipe context heteromerous.

Chemical tests (stipe surface): With 2% aq. phenol — greyish reddish brown; with 10% ferrous sulphate—yellowish pink; with formalin—negative.

Habit and habitat: Solitary or scattered, associated with *Cedrus deodara*, *Picea smithiana*, *Pinus wallichiana*, *Quercus incana* and *Rhododendron arboreum*.

Specimens examined: Acc. Nos. Shimla; HPUB 1167, 1350, 1363, 1375, 1416, 1497, 1533.

Remarks: This species resembles with the description of *Russula crustosa* Peck as given by Shaffer³ in all details. It is reported as edible by Krieger⁴ and Lincoff⁵.

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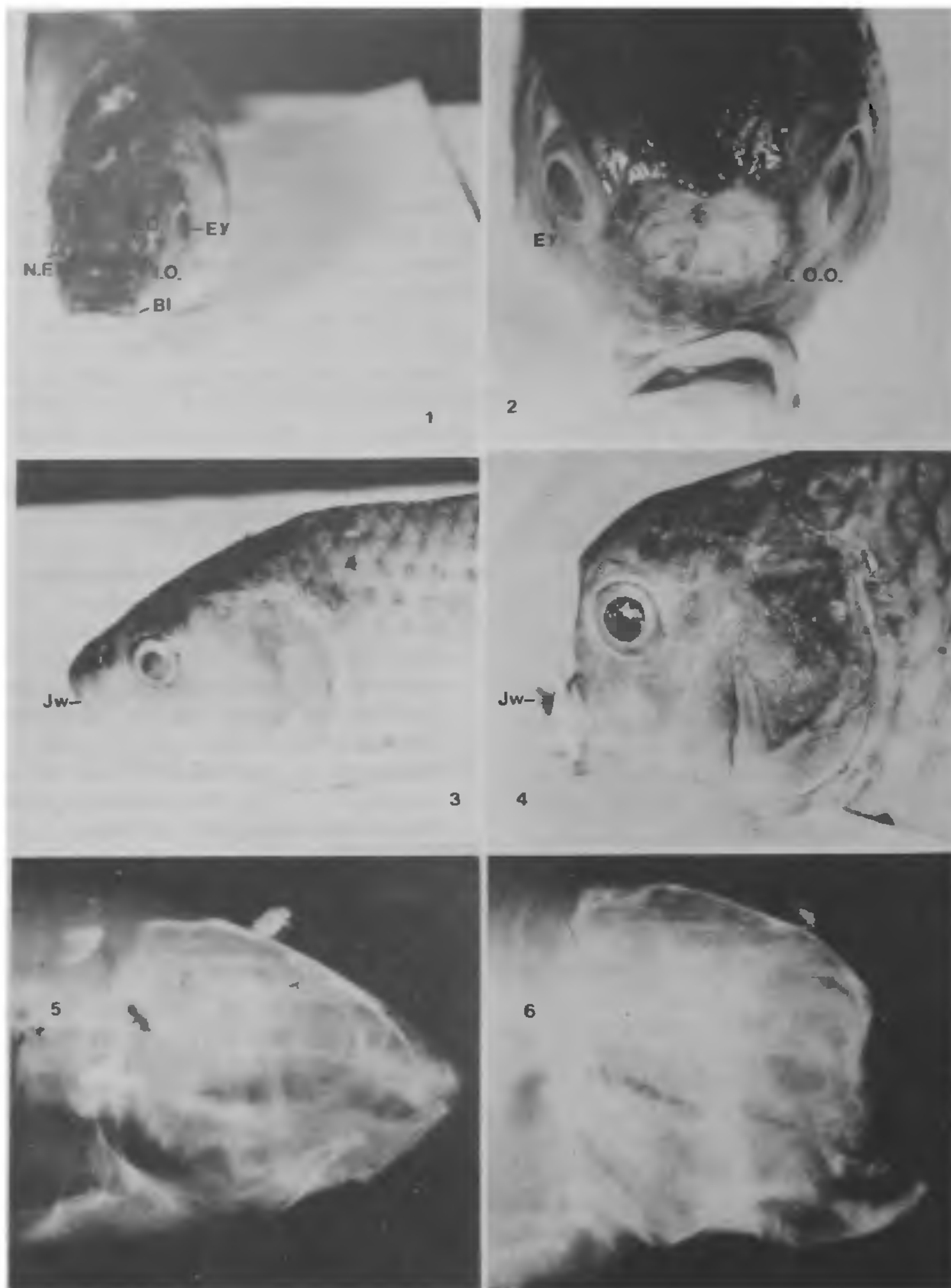
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ABNORMALITY IN OLFACTORY ORGAN AND JAWS OF THE EXOTIC CARP, *CYPRINUS CARPIO COMMUNIS* (LINN.)

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ALONG with normal fishes, a specimen of *Cyprinus carpio communis* (Linn.) with abnormal olfactory organ and jaws, was collected from Hussainsagar lake. Olfactory organs were dissected for detailed study and X-ray photographs were taken for both normal (figure 5) and abnormal (figure 6) fish of the same length range i.e. 264 mm. The olfactory organ¹ and morphometric details² of normal fish



Figures 1-6. Front view of; 1. normal fish showing nasal flap, exhalent and inhalent nasal opening; 2. abnormal fish showing fused olfactory organ; Lateral view of; 3. normal fish showing jaw; 4. abnormal fish showing deformed jaw; X-ray of; 5. normal fish in lateral view, showing bones of jaw and ethmoidal region; 6. abnormal fish in lateral view, showing degenerated bones of ethmoidal region and deformed jaw bones. [Bl, Barble; D, Dentary bone; D. Jw, Deformed jaw; E O, Exhalent opening; Ey, Eye; F O O, Fused olfactory Organ; I O, Inhalent opening; Jw, Jaw; L, Lacrymal bone; M, Maxillary bone; N, Nasal bone; N F, Nasal flap.]

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 ethmoidal, 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 lake³, 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.

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

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CATLA CATLA is the fastest growing food fish of India¹. 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 conditions². Natarajan and Jhingran³ 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 ± 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 Morgan⁴. 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.