indistinguishable from the normal complement and they regularly pair to from bivalent which generally behave normally during subsequent stages. However, evidence of elimination of chromosomes at certain meiotic stages has been obtained in some cases.

This carrier strain is under study in our laboratory for several years. The progeny of the carrier plant consists of both carriers and non-carriers. But the important point to be noted is that in carrier PMCs of carrier plants these B-chromosomes are generally two in number. Only in rare cases a variation from 1-3 has been noted. Out of 36 plants studied 23 were carriers. The frequency of PMCs having B-chromosomes in different carrier plants varied from 11·4% to 32·0%.

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NEW GENERA FROM THE EXOTIC BLOCK AT LAMAYURU, LADAKH

TEWARI AND PANDE[1] recorded the present of an exotic block at Lamayuru (34° 17′ 30″ N. : 76° 46′ 31″ E.) in Ladakh district. This exotic block lies within the Dras volcano-sedimentary suite of the Indus belt which is assigned a Cretaceous age on the basis of the presence of *Orbitolina* and *Hippurites*.

Tewari and Pande suggest a "probable Permian" age for this exotic block. The present authors have found additional fauna from this block. The new forms include the genera *Paradoxiella* sp., *Pachyphloia* sp. and *Colaniella* sp. which indicate a definite Upper Permian age for this block. Assemblage of *Pachyphloia* spp. and *Colaniella* spp. have been recently reported from Guryul Ravine in Kashmir[2], while *Paradoxiella* is not known from the Himalayas.

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HAEMATOLOGICAL STUDIES OF FRESHWATER TELEOSTS

THE morphological and physiological characteristics of fish blood have been studied by earlier workers—Gulliver[1], Margh[2], Bonnet[3], Dhar[4], Banerjee[5], Srivastava[6] etc. in the different species. Recently, Dube[7] studied the RBC counts and haemoglobin content in *Anabas testudineus*. The present communication attempts to report briefly the morphological studies of blood in *Labeo rohita, Labeo calbasu, Mystus seenghala and W. attu*.

Fishes of different weight ranging from 1·5 to 4·0 kg were collected from local ponds during summer 1975. Blood was collected from the heart after exposing it. Total RBC and WBC counts, Differential leucocyte counts (DLC), Haemoglobin content (Hb) and specific gravity of blood were determined by the standard methods described by Dacie and Lewis[8].

In the present investigation the RBC were found to be oval as well as circular. The average total numbers of RBC were found 3·37 and $2·97 \times 10^6/mm^3$ *L. rohita* and *L. calbasu* and 3·57 and $4·17 \times 10^6/mm^3$ in *M. seenghala* and *W. attu* respectively. The variation observed may be due to the ecological factors such as oxygen requirement of the species, oxygen tension of the environment and effificiency of the oxygen (Hall and Gray[9]).

The average total numbers of WBC in *L. rohita, L. calbasu, M. seenghala* and *W. attu* were found 14,000 18,000, 14,000 and $12,000/mm^3$ respectively. The counts are apparently higher than reported by Bagchi and Ibrahim[10].

The mean data for the DLC showed, lymphocytes (82·5, 86·0, 80·0 and 73·0%); neutrophils (13·0, 11·0, 15·0 and 21·0%); basophils (1·0, 1·0, 1·0 and 1·5%); Eosinophils (2·0, 1·0, 2·0 and 2·5%) and monocytes (1·5, 1·0, 2·0 and 2·0%) in *L. rohita, L. calbasu, M. seenghala* and *W. attu* respectively. The Variation observed in the DLC may be due to the physiological and ecological state of the fishes (Smith *et al.*[11]).

The average Hb content were found 10·8 and 8·2 gm% in *L. rohita* and *L. calbasu* and 9·2 and 11·6 gm% in *M. seenghala* and *W. attu* respectively. These values are well compared with those found by Pradhan[12] and Qayyum and Naseem[13].

The values for the specific gravity of plasma and whole blood were found to be similar, *i.e.*, 1·055 and 1·025 respectively in the fishes examined with the exception of *L. rohita* where the sp. gr. of plasma was observed to be 1·035. These values compare well with those of Bagchi and Ibrahim[10].

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VOMITING RESPONSE IN THE INDIAN FROGS *RANA TIGRINA* (DAUD) AND *RANA CYANOPHLYCTIS* (BOULENGER)

Introduction

Retrograde expulsion of stomach contents by vomiting is very well known in birds and in a large number of mammals. Pigeons of both sexes develop 'cytogenic crop glands' in their crops under the influence of gonadotropic pituitary hormones. Crop glands produce the 'pigeon's milk' which is regurgitated into the mouths of the chickens. Lower Chordates such as the lancelets (*Branchiostoma*) have the capacity to produce a '*rejection current*'. When after a couple of minutes of filtering the food from the water current, sand particles begin to obstruct the incoming water current. This rejection current is produced by the sudden contraction of transverse muscles of the atrial floor, causing the atrial opening to close and raising the atrial floor, thereby compressing the pharynx, which in turn ejects the water through the enterostome. There is a long evolutionary gap between the lower chordates and the birds and the mammals so far vomiting is concerned[1,6]. Attempts were made[8,12] to establish vomiting in the newts, frogs and toads. Both workers experimented upon fully pithed frogs after opening of the abdominal cavity. They also used subcutaneous and intragastric injections of certain emetics to bring about vomiting in frogs and toads in which brain and spinal cords were damaged. They, however, failed to induce vomiting in the newt *Triturus*. By extirpating the brain and the spinal cord[8] it was concluded that Anurans (at least *Rana* and *Bufo*) did not have a vomiting centre in the central nervous system The present author, by using well-fed, healthy and live frogs (*Rana tigrina* and *Rana cyanophlyctis*) has observed that like mammals, these frogs also have a vomiting control centre in the medulla and that vomiting is not uncommon in frogs in the experimental and probably also in the natural environs.

Material and Method

Frogs collected locally were well-fed and were given subcutaneous injections of various concentrations of emetics. Out of the stimulants and emetics tried (nicotine, atropine, suprarenal extract, sodium hydrate, apomorphine, and tartar emetic) best results were obtained with apomorphine and tartar emetic[4–5]. Pithed and chloroformed frogs were dissected for intragastric injections of emetics and local applications of emetics on the wall of the stomach.

Observations and Conclusions

Thirty frogs were given subcutaneous injections through the dorsal lymph sinus and quickly left under glass bell jars for observations. Another 20 frogs were first narcotized with 1 ml of 1% urethan solution injected subcutaneously through the dorsal lymph sinus and dissected soon after. The stomach was split open. Emetics and stimulants were applied directly over the mucosa of the stomach with the help of cotton buds to observe peristalsis of the gastric muscles. Observations are recorded in Table I.

It may now be noted that vomiting was brought about by apomorphine and tartar emetic. Stimulants like suprarenal extract, atropine, nicotine and sodium hydrate could induce peristalsis only. Effects of mild and small doses of apomorphine and tartar emetic injections were amazingly spontaneous. The injected frogs became highly excited, they opened and closed their mouths in quick successions and the tongue was shot out quite frequently. Throat exhibited strong gulping movements apparently to swallow the vomitus back down to the stomach. These responses continued for about 8 minutes, after which they slowed down. In about 30 minutes from the time of injection the frogs became unconscious. It was also observed that large and strong doses of apomorphine and tartar emetic inhibited vomiting, probably causing paralysis of muscles[5,7] and in the dogs.

In frogs with damaged brains, no vomiting could be induced either by injecting the emetics or by direct application of emetics on the gastric mucosa, but peristalsis was produced by a similar treatment with