Bull. Inst. Zool., Academia Sinica **22**(2): 269-271 (1983)

AN UNUSUAL PHENOMENON OF LOBULAR DEGENERATION IN THE TESTIS OF *CHANNA PUNCTATUS* (BLOCH)

KAMLESHWAR PANDEY AND PREM LATA AGARWAL

Department of Zoology, University of Gorakhpur
Gorakhpur, 273001, U. P., India

(Received February 18, 1983)

Kamleshwar Pandey and Prem Lata Agarwal (1983) An unusual phenomenon of lobular degeneration in the testis of *Channa punctatus* (Bloch). *Bull. Inst. Zool., Academia Sinica* **22**(2): 269-271. Degeneration in the testicular lobules has not been observed in the freshwater fishes and hardly any record is available. However, an excellent though sporadic phenomenon of lobular degeneration has been found to occur within the testicular lobules of *Channa punctatus*. During this study only some of the lobules have been found undergoing degeneration, while others appear to discharge their normal functions. Such degenerating lobules during the spawning phase of the testicular cycle though very much uncommon may be regarded as a possible process towards the elimination of old testicular debris.

Excellent reviews about the testicular structures in fishes are now available (Belsare, 1963; Hann, 1927; Lagios, 1965; Matthews, 1938). Histologically the testis of *Channa punctatus* does not show apparent structural variation from those of the earlier studies in *Monopterus albus* (Chan and Phillips, 1967) or *Embiotoca jacksoni* (Lagios, 1965). The testicular lobules in this fish show alike the tempo of spermatogenesis and hardly differences exist between its anterior and posterior part and differs from *Mystus seenghala* (Sathyanesan, 1959) and *Polypterus* (Kerr, 1919) where a sterile posterior part has been recorded. Each of the lobule is internally lined by germinal epithelium and separated through stroma. However, the occurrence of germinal epithelium has been denied by Dodd (1960) and Zukerman (1962). In addition, the differentiation of the testis into a cortical or medullary zone or the presence of radial septation (Matthews, 1938; Weisel, 1943) does not exist in *Channa punctatus*.

The origin of a new crop of the germ cells either has been attributed to the cells migrating from an extra testicular cord lying outside the testes (Turner, 1919) or from already existing germinal cells and their successive divisions (Hann, 1927; Van Oordt, 1952), or from the migratory germ cells (Gokhale 1957; Swarup, 1958). However, in the present study the germ cells are normally produced from the germinal epithelium lining with the testis lobules internally.

In one of the specimens collected from local lake at the end of the spawning period, some of the testicular lobules present a fascinating phenomenon of lobular degeneration. The degenerating lobules have been found to differ greatly from that of the normal lobules. Figs. 1 and 2 show that the degenerating lobules are apparently in an inactive state and functionally lag behind to the normal ones. Their lumen have, however, been found to incorporate with degenerating primary spermatocytes as their dominant cell type. The sloughed off germinal

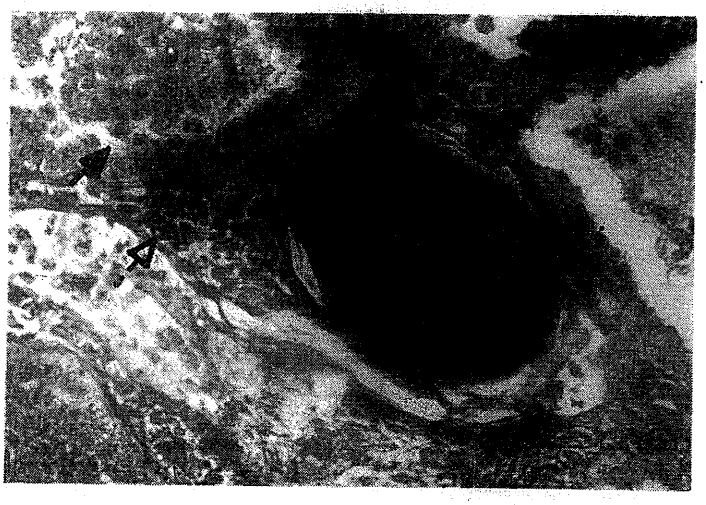

Fig. 1. Showing normal (—▶) and degenerating lobules containing primary spermatocytes (—▷). Mark degenerated and vacuolated interstitial Leydig cells (- -▷). ×240.

Fig. 2. Showing sloughed off germinal epithelium (—▶) with dissociating cells. Mark prominent vascularisation (- -▷) in the interlobular septa containing inactive interstitial Leydig cells (—▷). ×240.

epithelium shows dissolution. Surrounding these lobules a large number of blood cells are also prominently observed. Considerable number of interstitial Leydig cells show an inactive secretory state.

An overall consideration points out that such lobular degeneration may take place in only potentially incapable lobules which fail to continue spermatogenesis and undergo consequent degenerative changes during the post-spawning phase. Such an uncommon phenomenon may therefore, be associated with an unusual method of eliminating the testicular debris. The collagenous capsules described in the testis of *Channa marulius* (Swarup and Srivastava, 1979), in our opinion, are possibly the degenerating testis lobules in their final stage.

The occurrence of such an unusual phenomenon of lobular degeneraton in the testis of *Channa punctatus* appears to be though extremely uncommon but seemingly a significant

functional procedure. An instance of similar process in the freshwater Indian teleosts in general and in all probability *Channa punctatus* in particular is the first report of its kind.

Acknowledgements: Authors acknowledge with thanks the I. C. A. R., India for financial assistance.

REFERENCES

BELSARE, D. K. (1963) Development of the pituitary gland in *Channa punctatus* (Bloch). *J. Morph.* **113**: 151-160.

CHAN, S. T. H. and J. G. PHILLIPS (1967) The structure of the gonad during natural sex reversal in *Monopterus albus* (Pisces: Teleostei). *J. Zool.* **151**: 129-141.

DODD, J. M. (1960) In *Marshall's physislogy of reproduction* (Parke, ed.). Longmans Green, London. Vol. 1/2: 417-582.

GOKHALE, S. V. (1957) Seasonal histological changes in the gonads of the whiting (*Gadus merlangus* L.) and the Norway pout (*Gadus esmerkii* Nilsson). *Indian J. Fish.* 4: 92-112.

HANN, H. W. (1927) The history of germ cells of *Cottus bairdii*. *J. Morph.* **43**: 427-497.

HYDER, M. (1970) Histological studies on the testis of pond specimens of *Tilapia nigra* (Günther) (Pisces : Cichlidae) and their implications of the pituitary testis relationship. *Gen. Comp. Endocrinol.* **14**: 198-211.

KERR, G. (1919) *Text-book of embryology*. MacMillan and Co., Ltd., London.

LAGIOS, M. D. (1965) Seasonal changes in the cytology of the adenohypophysis testes and ovaries of the black sea perch, *Embiotoca jacksoni*, a viviparous percomorph fish. *Gen. Comp. Endocrinol.* **5**: 207-221.

MATTHEWS, S. A. (1938) Seasonal cycle in the gonads of *Fundulus*. *Biol. Bull.* **75**: 66-75.

PANDEY, K. and M. MISRA (1981) Cyclic changes in the testes and secondary sex characters of fresh water teleost *Colisa fasciatus*. *Arch. Biol. (Bruxelles)* **92**: 433-449.

RAI, B. P. (1965) Cyclical changes in the testis of the mahseer, *Barbus tor* (*Tor tor*). *Acta Anat.* **62**: 461-475.

SATHYANESAN, A. G. (1959) Seasonal histological changes in the testis of cat fish *Mystus seenghala* (Sykes). *J. Zool. Soc. India* **2**: 52-59.

SWARUP, H. (1958) The reproductive cycle and development of the gonads in *Gasterosteus aculeatus* L. *Proc. Zool. Soc. Bengal* **11**: 47-60.

SWARUP, K. and S. SRIVASTAVA (1979) Cyclic changes in the testicular activity of fresh water large murrel *Channa marulius* (Ham.). *Nat. Acad. Sci. Letter* **2**(2): 83-84.

TURNER, C. L. (1919) The seasonal cycle in the spermary of the perch. *J. Morph.* **32**: 681-711.

VAN OORDT, G. J. (1925) The relation between the development of the secondary sex characters and the structure of the testis in the teleost *Xiphophorus helleri*. *J. Exp. Biol.* **3**: 43-49.

WEISEL, G. E. (1943) A histological study of the testes of the sockeyed salmon, *Oncorhynchus nerka*. *J. Morph.* **73**: 207-230.

ZUKERMAN, S. (1962) *The ovary*. Vol. I. Academic Press, New York and London.

斑點鱧魚精巢小葉之非尋常退化現象

K. PANDEY AND P. L. AGARWAL

在淡水魚裏，幾乎未見有關其精巢小葉退化的報告，但在斑點鱧魚 (*Channa punctatus*) 之精巢小葉却發生零星退化的情形。在本研究中，發現精巢之部份小葉具退化現象，而其他的小葉則似仍保留正常的功能。雖然這些退化的小葉不尋常地存在於精巢週期中的生殖期，這事實或許可以認爲是去除老舊精巢殘餘物的一個可能過程。