



UNIVERSITY GRANTS COMMISSION - CENTRAL REGIONAL OFFICE,

Tawa Complex (Batan Market), E-5, ARECA COLONY, BHOPAL-462 016
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Date: _____

To
The Principal,
Agrawal P.G. College
Jaipur(Raj)

Sub. : Financial Assistance for undertaking Minor Research Project by Dr. Krishan Kumar, Lecturer and Head(Zoology), Agrawal P.G. College, Jaipur(Raj), in "The Emerging Phenotype : Ecological Genetics of Color, Form and Sex in the Common Asian Toad (Bufo Melanostictus) from Foothills of Aravalliranges in Rajasthan."

Sir,

The Commission on the recommendations of the Selection Committee has approved the research project entitled in "The Emerging Phenotype : Ecological Genetics of Color, Form and Sex in the Common Asian Toad (Bufo Melanostictus) from Foothills of Aravalliranges in Rajasthan." of by Dr. Krishan Kumar, Lecturer and Head(Zoology) Agrawal P.G. College, Jaipur(Raj), and has agreed to provide a grant of Rs. 190000/-.

Particular	Allocation	Grant being released
NON RECURRING		
1. Books & Journals	Rs. 10000.00	Rs. 10000.00 ✓
2. Equipments	Rs. 190000.00	Rs. 150000.00 ✓
RECURRING		
3. Travels, Field work	Rs. 10000.00	Rs. 5000.00 ✓
4. Contingency	Rs. 10000.00	Rs. 5000.00 ✓
5. Chemical & Glassware	Rs. 10000.00	Rs. 5000.00 ✓
6. Special Needs	Rs. 0.00	Rs. 000 ✓
TOTAL	Rs. 190000.00	Rs. 175000.00

I am directed to convey the sanction of the Commission for Payment of Rs. 175000/- as first installment to The Principal, Agrawal P.G. College, Jaipur(Raj), under following terms and conditions:

1. The effective date of implementation of the Project will be the date of receipt of fund by the institution.
2. The tenure for the Minor Research Project will be 18 months with 3 months of extension, which would be permissible only under special circumstances and will be without any Financial Assistance.
3. On receipt of this letter the Principal Investigator must sign and return the Acceptance Certificate as enclosed duly countersigned by the Principal within 3 month of issue of this letter, failing which the approval should stand withdrawn.
4. In case, the grant is not settled within six months from the date of completion of the project, the same will lapse and no representation will be entertained on this behalf and Principal Investigator has to refund the whole grant.
5. Principal Investigator may undertake only one project at a time under UGC funding either by the UGC, H.O., New Delhi or by the C.R.O., Bhopal. The letter of undertaking enclosed may be sent to this office immediately after receiving this sanction. Failure to the submission of this and also in running two parallel projects funded by the UGC (Regional Office/Main Office at New Delhi), the Principal Investigator will be held solely responsible and have to refund the amount as and when it comes to the notice of the authorities.
6. The College shall maintain proper accounts of the expenditure out of the Grants which shall be utilised only on approved item of expenditure as per detailed in XI Plan Guidelines.

**SUMMARY REPORT OF
MINOR RESEARCH PROJECT**

Financial Assistance Ref.No. M/S-93/304001/12-13/CRO/31.03.2013

PROJECT TITLE

**The Emerging Phenotype: Ecological Genetics of color, form
and sex in the common Asian toad (*Bufo melanostictus*) from
foothills of aravalli of rajasthan.**

Principal Investigator

Dr. KRISHAN KUMAR

Lecturer and Head,

P.G. Department of Zoology,

Agrawal P.G.College

Sanganeri Gate, Jaipur-302001

TO

UNIVERSITY GRANTS COMMISSION.

BHOPAL

Amphibians are the first vertebrates to become adapted to life on land. The anurans are found in ponds, marshy ditches grassy lands, gardens etc. frogs and toads hibernate during winter and aestivate during summer seasons.

It is generally believed that amphibians populations have numerically decreased in recent years due to dismanagement of agro ecosystems and denudation of habitats, although no published data on the community structure of amphibians in Indian ecosystems is available. On this assumption Government of India has banned the export of frog legs. Pandian and Marian (1986) estimated that 18 million frogs were exported to earn foreign exchange till a ban on the frog export from India was implemented. Keeping these facts in mind the present work involving 18 months of field work was designed to investigate the present species inhabiting Rajasthan in different regions. One of the aim of present study was find out Geographical distribution, Habit and Habitat in Rajasthan.

Three Indian anurans *Occidozyga hexadactyla*, *Occidozyga cyanophlyctis* and *Bufo melanostictus* are known to exhibit continuous spermatogenetic cycle.

The Aravalli range, which forms the chief topographical features in Rajasthan diagonally bisect the state into 3/5 western arid region and the 2/5 eastern semi arid zone. Climatically, Rajasthan has three seasons, summer (March to Mid June), rainy (Mid June to September) and winter (October to February).

Materials and Methods

Amphibians confined to geographical limits of Rajasthan was studied and survey was made to locate these species. Amphibians killed on roads were observed carefully. They proved to be a good source to confirm their distribution in particular area. The study sites were the central, North-Eastern, Eastern, Western & Southern districts of Rajasthan. The survey was made during December 2013 to March 2015.

Study Sites

The Rajasthan University Campus consisting of faculty quarters, hospitals, school building, park area road sides, grass fields and residential area near the campus and Jhalana Park were chosen for & study sites.*

Sampling

On each sampling day 4 hours of sampling (One time unit) from 3 to 7 a.m. and again from 7 to 10 p.m. was done by using large torches and collecting nets 5 to 6 days of sampling continuously.

STUDY OF GEOGRAPHICAL DISTRIBUTION OF ANURANS IN RAJASTHAN

- (a) Eastern Region
- (b) Western Region
- (c) Northern Region
- (d) Southern Region
- (e) North-Eastern Region
- (f) South-Eastern Region

- (g) Central Region

(II) STUDY OF HABITS AND HABITATS

- (a) Ecology
- (b) Morphometric parameters
- (c) Breeding habits

(III) SEASONAL CHANGES IN THE GONADS OF TOAD/FROG INHABITING JAIPUR REGION

- (a) Prebreeding season
- (b) Breeding season
- (c) Post breeding season

Maintenance of animals

The frogs were introduced into an artificial pond in departmental forgerly to study their in captivity.

Anaesthetization

Whenever needed the adult males were anaesthetized with diethyl ether.

Morphometric Parameters

Length of adults were measured from snout to vent length (SVL), head length (HL), head width (HW), hand length (HNL) were taken with the help of calipers and occular stage micrometer scale.

Conclusion

It is concluded that while spermatogenesis occurs in the testes throughout the year its intensity varies in different seasons. Spermiogenesis (transformation of

spermatids into spermatozoa) is inhibited or does not occur at all during winter (October to February) although spermatids are present in fair numbers in this period. The testes are most active during March to August when all the three terminal stages (secondary spermatocytes, spermatids and spermatozoa) are abundant.

It is suggested that the race of *Bufo melanostictus* inhabiting Jaipur region may be considered as belonging to the category of "potentially continuous types" with respect to spermatogenesis.

Seasonal changes in the ovaries: All stages of oocytes growth including oogonia primary oocyte and growing oocytes showing various degrees of yolk deposition and present in the ovaries sectioned and histologically examined in each of the 12 months during the year. The relative abundance of oocytes at different stages of growth in the ovaries varied in different seasons.

Numerically the relative percentage of Primary oocyte almost steadily increased from August to February followed by a continuous decrease from March to July growing oocytes steadily increased in numbers from February to July and then decreased during August and September. Their number increased again during the next one month and then remained more or less constant from October to February.

Atretic follicles were absent in ovaries sampled from November to January. They were present in small numbers in February and March ovaries after which their number increased gradually reaching the highest level in September-October.

The maximum weight of ovary per 100 gm body weight was found in case of July ovaries. It as much lower in August remaining at approximately the same level until February. Thereafter it steadily increased to reach the highest in July indicating that the most rapid growth of oocytes due to vitellogenesis occurs after the hibernation during the short spring and summer upto the start of breeding monsoon season.

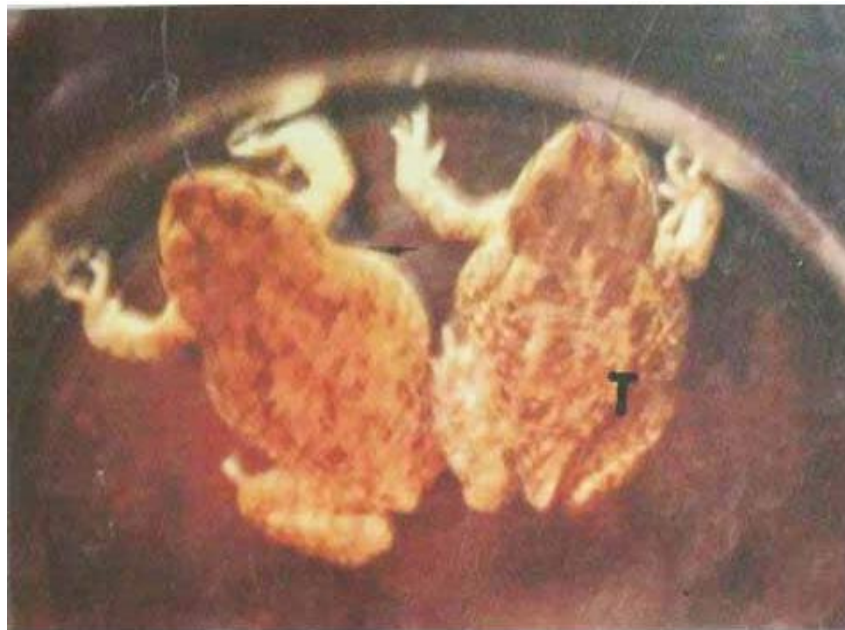


Fig. 1: Microphotograph of male and female toad *Bufo melanostictus*



**Fig. 2: Microphotograph of male toad
*Bufo melanostictus***



**Fig. 3: Microphotograph of male toad
*Bufo melanostictus***



**Fig. 4: Microphotograph of female toad
*Bufo melanostictus***

A = Adult; M = Mouth; D = Dorsal surface

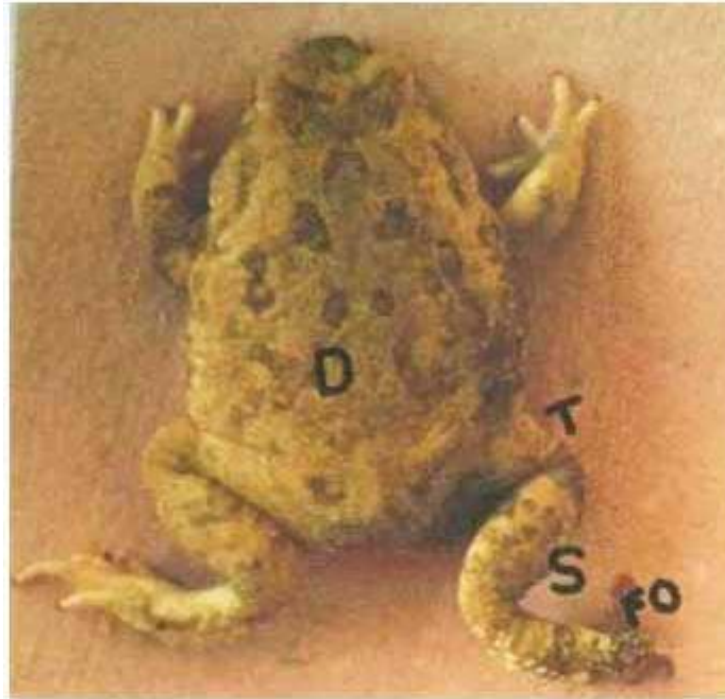


**Fig. 5: Microphotograph of male toad
*Bufo melanostictus***



**Fig. 6: Microphotograph of female toad
*Bufo melanostictus***

ST = Stomaticus; TY = Tympanum



**Fig. 7: Microphotograph of male toad
*Bufo melanostictus***

D = Dorsal surface; S = Shank; T = Thigh; Fo = Foot



**Fig. 8: Microphotograph of male toad
Bufo melanostictus in captivity**



**Fig. 9: Microphotograph of female toad
Bufo melanostictus in captivity**



**Fig. 10: Microphotograph of female toad
Bufo melanostictus in captivity**



**Fig. 11: Microphotograph of toad
Bufo melanostictus in natural habitat**



**Fig. 12: Microphotograph of ovary of female toad
*Bufo melanostictus***



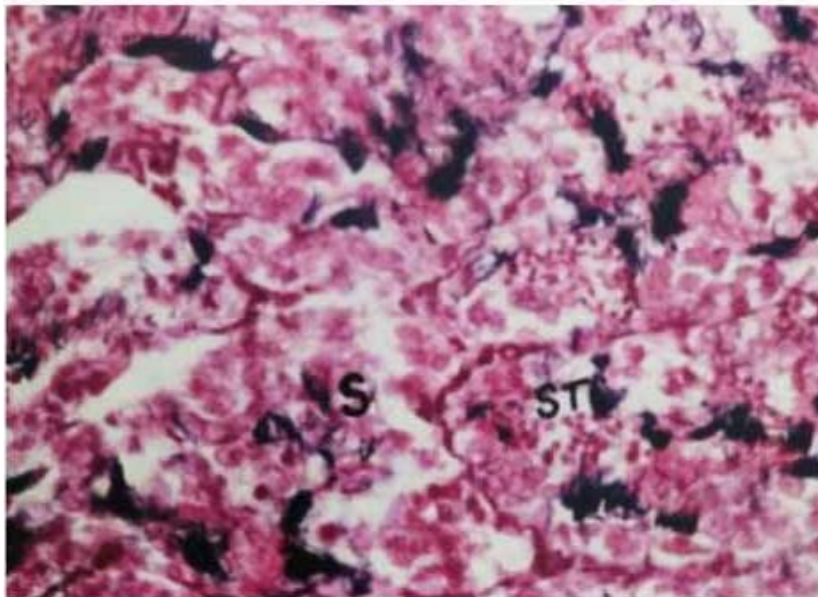
**Fig. 13: Microphotograph of ovary of female toad
Bufo melanostictus (ovary with egg)**



**Fig. 14: Microphotograph of male toad
*Bufo melanostictus***



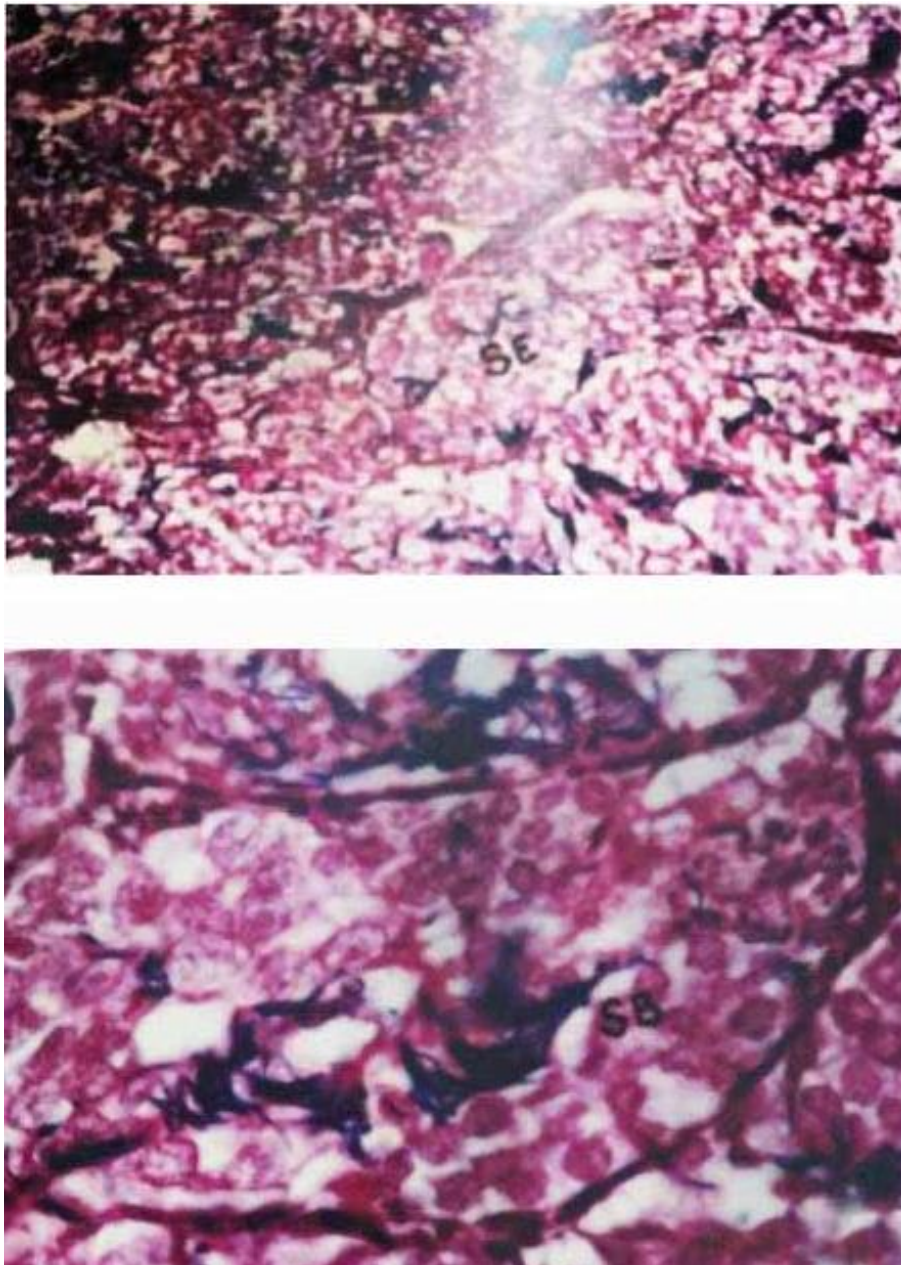
**Fig. 15: Microphotograph of female toad
*Bufo melanostictus***



**Fig. 16: Cross section of testes in toad
*Bufo melanostictus***

ST = Spermatid

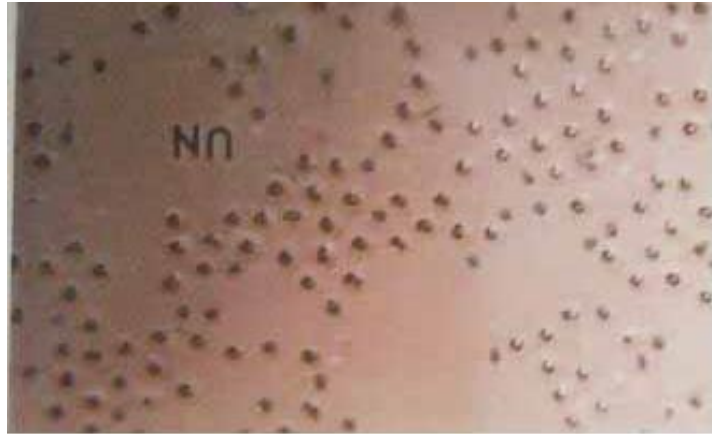
S = Sperm



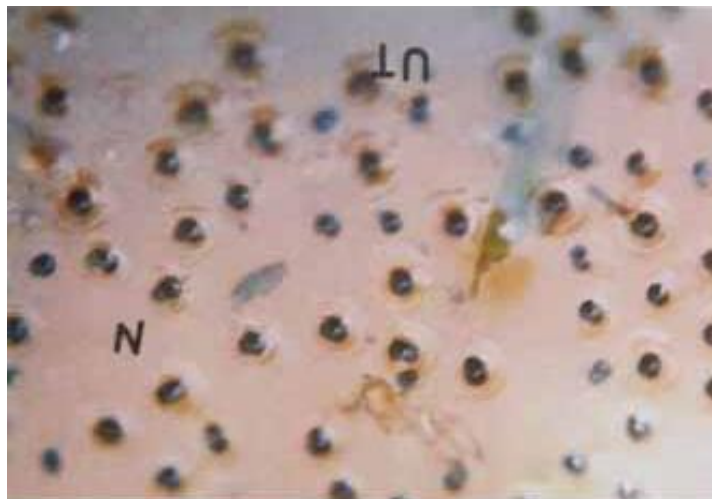
**Fig. 17: Cross section of testes in toad
*Bufo melanostictus***

SE = Seminiferous tubule

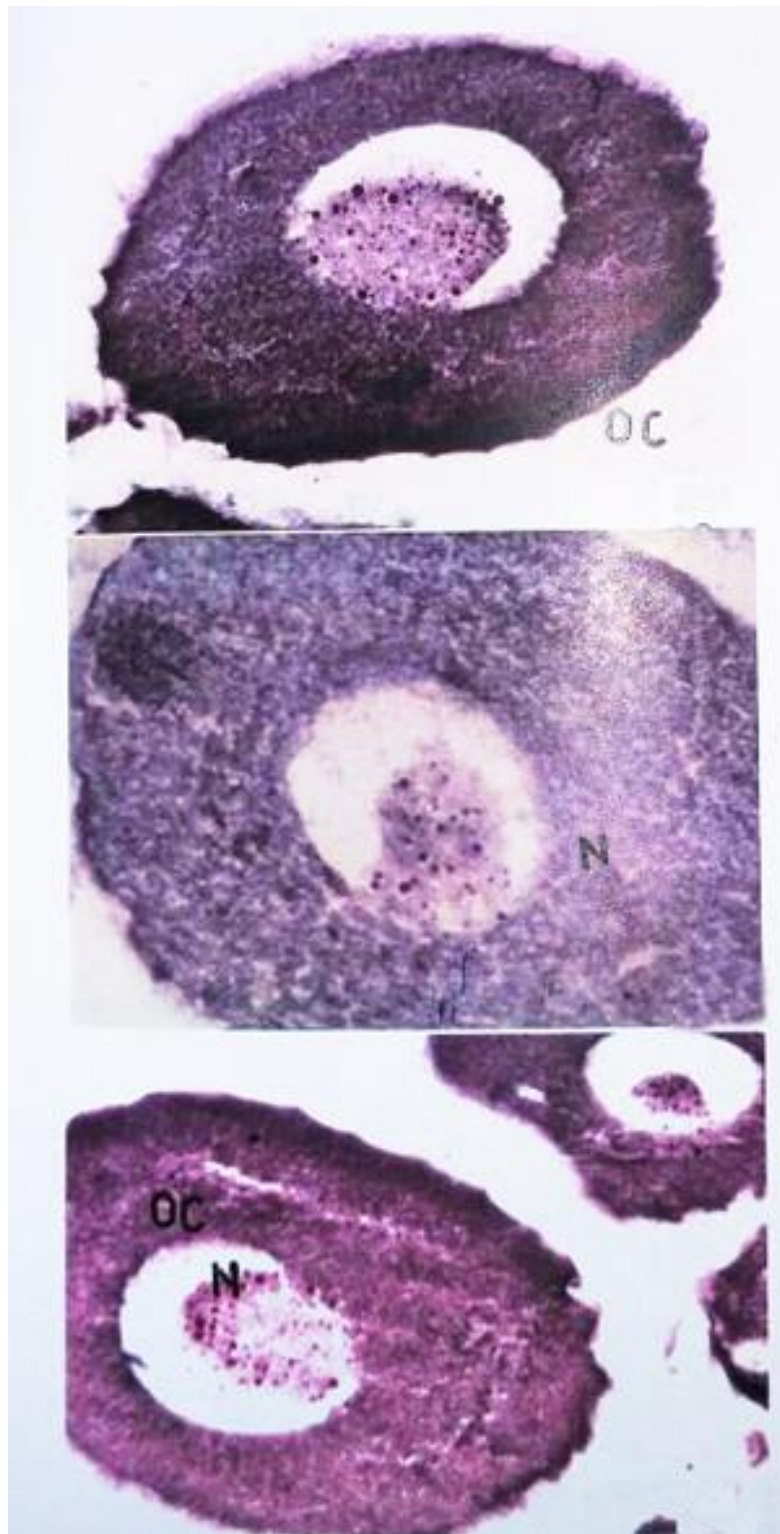
S = Sperm bundle



**Fig. 18: Microphotograph of toad
Bufo melanostictus (Neurula stage)**



**Fig. 19: Microphotograph of toad
Bufo melanostictus (Tadpoles)**



**Fig. 20: Cross section of ovary in toad
*Bufo melanostictus***

N = Nucleus

OC = Oocyte