

**ECOLOGY AND FOOD HABITS OF COMMON SKITTERING FROG,  
*EUPHLYCTIS CYANOPHLYCTIS* (SCHNEIDER, 1799) IN  
BANGLADESH**

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**Abstract**

The Common Skittering Frog, *Euphlyctis cyanophlyctis* was observed to inhabit in aquatic and semi-aquatic habitats with sparse vegetation covering cultivated lands, irrigation channels, marshes, ditches, domestic and derelict ponds, pools, puddles, wetlands, low lying areas, water logged areas, along the dikes or roads and towards the nearest sources of water. A total of 75 individuals was collected during the period from July, 2012 to June, 2013 from the village Bara Hazratpur, Mitapukur thana under Rangpur District and their food habits were studied. The average body weight of the frogs was  $109.57 \pm 23.05$ g and the average weight of the consumed food by each animal was  $5.40 \pm 3.65$ g with a variation between 0.1g and 13.3g which was 4.92% of their body weight. A total of 34 food items was found in the stomachs of 75 common skittering frogs. All the food items found in the stomachs were animal foods. The frogs fed mainly on insects (57.95%) that followed crustacean (13.89%), fishes (10.19), arachnids (9.36%), annelids (6.8%), amphibians (2.24%). The consumption of food varied seasonally, being much less in winter than in summer or rainy season. The percent frequency occurrence of insects in relation to the total number of food items was more or less same in all seasons. Insect food items were under 18 families belonging to 10 orders, most of which are harmful to agriculture, gardens and human residences. So, education and awareness have been suggested through printed and electronic media regarding their contribution in maintaining ecological balance and role in ecosystem. The species should be conserved for maintaining natural balance and economy of the country.

Key words: Ecology, Common skittering frog, Food habit, Bangladesh

**Introduction**

Frogs play an important role in the ecosystem by feeding on a variety of invertebrate and small vertebrate animals and thus control the ecological balance (Rao and Cherian 1940). The frog population is declining due to food scarcity (Sanil and Andrews 1995). Frogs are economically important as major predators of insects (Alam *et al.* 1992). Orthopter species were the available food items in the stomachs of skittering frogs during the major part of the year (Issac and Rege 1975). *E. cyanophlyctis* consumed large amount of nymphs of grasshoppers in the rice field and thus acted as one of the natural controlling agents of rice grass hoppers (Sharma 1995).

Some works have been undertaken on food habits of frogs in different countries including Bangladesh by Raj (1915), Davidson (1916), McCann (1933), Singhi (1940),

Bhaduri (1945), Benerjee (1954), Ali (1955), Khan (1973), Deniel (1975), Dutta and Mohanty Hajmadi (1976), Fugler (1982), Ahasan (1983), Joshee (1986), Chakrabarti (1987), Raj *et al.* (2005), Sharifi (2009), Saima *et al.* (2010) and Frost (2013). The present study deals with the food habits, food preference and seasonal variation of *E. cyanophlyctis*. The findings will help the future researchers to assess the contribution of the species towards nature and to develop conservation measures.

### **Materials and Methods**

The study was conducted in a fish project, Universal Agrofisheries, consisting eight nursery and five culture fish ponds and adjacent low lying agriculture fields, fellow lands, irrigation channels, wetlands under the village Bara Hazratpur, Mitapukur thana of Rangpur District. Data were processed in computer software, MS Excel using statistical software SPSS (Version 10.0). Seasonal differences in food consumption were tested by Chi-square test. Significance was tested at the  $p < 0.05$  levels.

*Study of food habits* : A total of 75 *E. cyanophlyctis* was collected mainly at midnight from the natural habitats to know the qualitative and quantitative information on food habits. The frog specimens were captured from open water of some nursery fish ponds and in dishes of low lying areas of agriculture fields and were anesthetized instantly. The body weights were measured by spring balance and then the stomachs of the frogs were dissected out in the field and then preserved in airtight container. The foods were then separated item wise by incising the stomachs longitudinally and preserved in preservatives. A solution of 5% formalin and 1% glycerin was used as preservatives. The stomachs and stomach contents were weighed and the stomach contents were examined under binocular microscope. The qualitative analysis of food items was made. The stomach contents of each frog were categorized into groups: (a) animal foods and (b) accidental food particles. The quality of consumed food by the frog species was also made. The food items were identified at species level by consulting books, guides and specialists of the respective fields. Identification was done by consulting the books (Borror and DeLong 1954 and Imams 1965). Stomach content of individual frog was measured for quantitative analysis according to Hartley (1948). At least five stomachs were collected for each month and consumed food items were separated and made food preferences.

*Food consumption in different season*: Food consumption was calculated in different months and later in different seasons and converted to percentage in relation to body weight. Regression analysis was also made and seasonal difference was tested by Chi-square methods. The monthly food consumption was also studied in all the three seasons throughout the study period to know the seasonal difference. For convenience, the study period was divided into three seasons: Summer (March to June), Rainy (July to October) and Winter (November to February). Of the frogs 25 specimens were captured in summer, 25 rainy and 25 in winter seasons. The frequency of every food item was

transformed into percent frequency of occurrence in two ways: firstly, calculation was made in relation to total number of food items found in the total number of stomachs and secondly, in relation to the total amount of food contents found in the stomachs studied.

## Results and Discussion

### Food habits in nature

*Qualitative analysis:* A total of 34 food items was identified in the 75 stomach contents. The frog has been identified as carnivore because all the food items found in the stomach contents were aquatic, semi-aquatic and terrestrial animals (Table 1). The major food items were insects (57.95%), Crustacians (13.89%), Fishes (10.19%), Arachnids (9.36%), annelids (6.8%), amphibians (2.24%). Insects were the major portion of their diet. Alam *et al.* (1992), Benerjee (1954) and Saima *et al.* (2010) stated that the frogs preferred animal foods to plants i.e. they fed on young frogs, fish, crustaceans, snails, earthworm, insects in nature. Fugler (1984) stated that it is carnivore but mainly fed on insects.

Table 1. Food items found in the stomachs of Common Skittering Frog, *Euphlyctis cyanophlyctis*.

Classified food items	Group (Order & Family)	Frequency of occurrence (No)	Frequency of occurrence (%)	Total weight of stomach contents(g)	Occurrence relation to consumed food (%)
Earth worm, <i>Metaphire posthuma</i>	O- Neo- oligochaeta F- Megascolecidae	43	57.33	19.5	6.81
Masoni crab, <i>Potemon masoni</i>	O-Decapoda F-Palaemonidae	56	74.66	30.0	10.48
Freshwater prawn, <i>Macrobrachium</i> spp.	O-Crustacea F-Palaemonidae	15	20.00	7.3	3.42
Grasshopper, <i>Melanoplus differentialis</i>	O-Orthoptera F-Acridae	75	100.00	29.5	10.30
Bush katydid, <i>Microcentrum rhombifolium</i>	O-Orthoptera F-Tettigoniidae	53	70.67	17.8	6.22
Caddisfly, <i>Hydropsyche simulance</i>	O-Trichoptera F- Hydropsychidae	27	36.00	5.5	1.92
Broadheaded bug, <i>Coriscus curinus</i>	O-Hemiptera F-Alydidae	16	21.33	13.5	4.72
Creeping water bug, <i>Pelocoris femoratus</i>	O-Hemiptera F-Nepidae	36	48.00	20.5	7.16
Water scorpion, <i>Ranatra fusca</i>	O-Hemiptera F-Notonectidae	13	34.67	4.2	1.46
Blister beetle, <i>Macrobasis unicolor</i>	O-Coloeptera F- Meloidae	19	25.33	5.5	1.92

Contd.

Classified food items	Group (Order & Family)	Frequency of occurrence (No)	Frequency of occurrence (%)	Total weight of stomach contents(g)	Occurrence relation to consumed food (%)
Trogid beetle, <i>Geotrupes splendidus</i>	O-Coloeptera F-Scarabaeidae	37	49.33	5.8	2.03
Hermit flower beetle, <i>Osmoderma eremicola</i>	O-Coloeptera F-Scarabaeidae	29	38.67	8.0	2.79
Long horned wood boring beetle, <i>Goes tigrinus</i>	O-Coloeptera F-Cerambycidae	11	14.67	5.5	1.92
Tortoise beetle <i>Chelymorpha</i> sp.	O-Coloeptera F- Chrysomelidae	17	22.67	5.5	1.92
Eastern tent caterpillar, <i>Malacosoma amerecanum</i>	O-Lepidoptera F- Lasiocampidae	18	24.00	6.8	2.38
Geometrid moths, <i>Ennomos</i> sp.	O-Lepidoptera F-Geometridae	42	56.00	6.3	2.20
Butterflies, <i>Nymphalis</i> sp.	O-Lepidoptera F-Nymphalidae	56	74.67	8.2	2.87
Dragon fly, <i>Argia emma</i>	O-Odonata F- Coenagrionidae	45	60.00	5.4	1.87
Black ant, <i>Componotus compressus</i>	O-Hymenoptera F-Formicidae	51	68.00	3.0	1.04
Potter wasp, <i>Polistes habracus</i>	O-Hymenoptera F- Vespidae	32	42.67	4.0	1.40
<i>Anopheles</i> sp.	O-Diptera F-Culicidae	27	36.00	2.0	0.70
Stone fly nymphs, <i>Isoperla</i> sp.	O-Plecoptera F-Isoperlidae	18	24.00	2.5	0.87
Common millipede <i>Spirobolus marginatus</i>	C-Diplopoda F-Julidae	07	9.33	6.5	2.27
Garden spider, <i>Argiope aurantia</i>	O-Araneida F-Arghiopidae	61	81.33	9.0	3.14
Ground spider, <i>Lycosa</i> sp.	O-Araneida F-Pisauridae	26	34.67	6.2	2.17
Jumping spider, <i>Phidippus audax</i>	O-Araneida F-Lycosidae	43	57.33	6.0	2.10
Crab spider, <i>Misumenops</i> sp.	O-Araneida F-Thomisidae	28	37.33	5.6	1.96
Titpunti, <i>Puntius</i> spp.	O- Cypriniformes F-Cyprinidae	24	32.00	5.0	1.75

Contd.

Classified food items	Group (Order & Family)	Frequency of occurrence (No)	Frequency of occurrence (%)	Total weight of stomach contents(g)	Occurrence relation to consumed food (%)
Mola fish, <i>Amblyphrayngodon mola</i>	O- Cypriniformes F-Cyprinidae	17	22.67	3.5	1.22
Darkina fish, <i>Rasbora daniconius</i>	O- Cypriniformes F-Cyprinidae	14	18.67	3.6	1.26
Kash khaira, <i>Chela laubuca</i>	O- Cypriniformes F-Cyprinidae	9	12.00	1.5	0.52
Telapia fish fry, <i>Telapia mosambica</i>	O- Cypriniformes F-Cyprinidae	74	98.67	15.6	5.45
Young Toad, <i>Duttaphrynus melanostictus</i>	O-Anura F-Bufoidea	12	16.00	2.5	0.87
Young Frogs <i>Euphlyctis</i> spp.	O-Anura F-Ranidae	17	22.67	4.0	1.38

Stomachs of 75 frogs, weighing 65 to 165 g (average  $109.57 \pm 23.05$  g), were studied and found that the average weight of the consumed food of each frog was  $5.40 \pm 3.65$  g. The amount of food found in the stomachs collected in different months of the year showed that the consumption was much lower during winter months, than the rainy and summer months (Table 2).

Table 2. Food habit of *Euphlyctis cyanophlyctis* in different seasons studied in nature.

Study period	Sample Size (No)	Wt. of stomach contents (g)	Food consumption per individuals			Mean body weight of skittering frogs (g)
			Range (g)	Mean $\pm$ SD	% to body weight	
Summer (Mar. – June)	25	200.2	1.6 – 13.0	$8.00 \pm 3.09$	7.02	$113.8 \pm 18.78$
Rainy (July - Oct.)	25	157.4	1.2 – 13.3	$6.30 \pm 3.08$	6.16	$102.32 \pm 18.34$
Winter (Nov. – Feb)	25	47.3	0.1 – 4.6	$1.89 \pm 1.18$	1.68	$112.6 \pm 29.44$

The weight of consumed food was much lower during winter months ( $1.89 \pm 1.18$  g) and that was 1.68% in relation to average body weight. A total 34 food items were indentified in the stomachs all of the food items were animal foods. Insects constituted 57.95% of the food and other than insects, spiders, crabs, annelids, small fishes and small amphibians were found in their stomachs which covered 42.05% (Fig. 1).

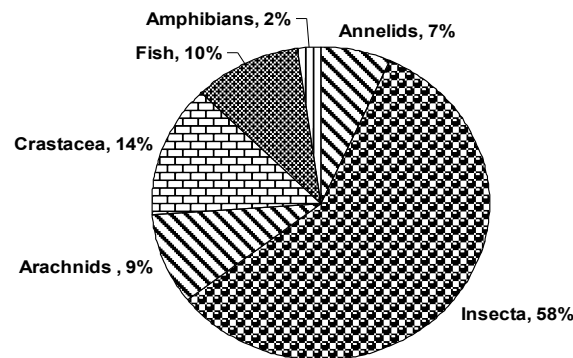


Fig. 1. Food consumption of *Euphlyctis cyanophlyctis*.

*Quantitative analysis:* The consumption of insects by common skittering frog was very high throughout the year (Fig. 2). Insects were found in each of the 75 stomach contents. The amount of food items found in each stomach varied from 0.1 to 13.3 g (mean was  $5.40 \pm 3.65$ g). The mean weight of dissected frogs was  $109.57 \pm 23.05$ g (range 65 to 165g). The food consumption was 4.92% in relation to mean body weight of the dissected frogs. The highest consumed food item was grasshopper, *Melanoplus differentialis* (14.22%) and the least consumed food item was common millipede, *Spirobolus marginatus* (0.41%). Insects were found in almost all the stomachs ( $n = 75$ ) and thirteen stomachs contained the young frogs.

*Seasonal variation:* During summer, 25 stomachs were analyzed and 27 food items were identified. The total weight of stomach contents of 25 frogs was 200.2 g and the mean body weight of the frogs was  $113.8 \pm 18.78$  g. Of the food items, *Melanoplus differentialis* was common and found in 25(100%) stomachs and *Spirobolus marginatus* was in 7 (9.33%) stomachs. The food consumption varied from 1.6 to 13.0g (mean  $8.00 \pm 3.09$ g). This consumption was 7.02% in relation to the mean body weight (Table 2).

In the monsoon, 25 stomachs were analyzed and identified 28 food items. The weight of stomach contents was 157.4 g and the mean weight of the frogs was  $102.32 \pm 18.34$ g. Of the food items, *Melanoplus differentialis* was common and found in all the stomach contents. The least number of food items was amphibia that was found only in 13(17.33%) stomachs. The food consumption varied from 1.2 to 13.3g (mean was  $6.30 \pm 3.08$  g). This consumption was 6.16% in relation to the mean weight of common skittering frogs (Table 2).

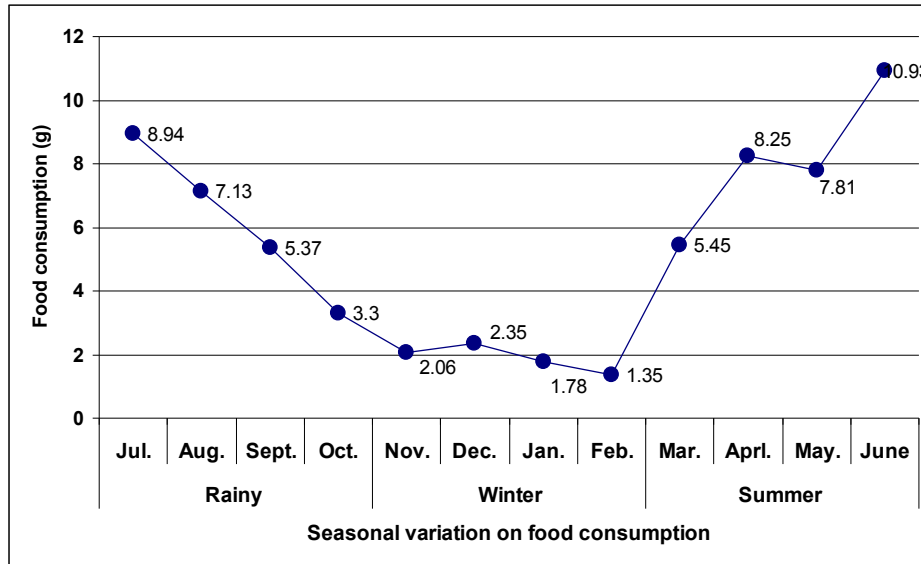


Fig. 2. Seasonal variations of food consumption by *E. cyanophlyctis*.

In winter, 13 food items were identified from 25 stomach contents. The weight of each stomach contents was 47.3g and the mean weight of the frogs was  $112.6 \pm 29.44$ g. Of the food items *Melanoplus* sp was common and found in 15(20%) stomachs. The food consumption varied from 0.1 to 4.6 g (mean  $1.89 \pm 1.18$ g). The food consumption was 1.68% in relation to the mean body weight of the frogs. There was no significant difference of food consumption by *E. cyanophlyctis* in different seasons of the year ( $\chi^2 = 3.68$ ,  $df = 2$  and  $p < 0.05$ ).

Food preference: On the basis of the analysis of stomach contents it was found that the most preferred food items were Grasshopper, *Melanoplus differntialis*, Talapia fish fry, *Telapia mosambica*, Garden spider, *Argiope aurantia*, Butterflies, *Nymphalis* sp., Masoni crab, *Potemon masoni*, Bush katydid, *Microcentrum rhombifolium*, Black ant, *Componotus compressus*, Dragon fly, *Argia emma*, *Metaphere posthuma*, Jumping spider, phidippus audax, Ground spider, *Lycosa* sp., Crab spider, *Misumenops* sp. etc. (Table 1).

Insects were represented by Orthoptera (20.98%), Hemiptera (6.05%), Coleoptera (10.17%), Lepidoptera (4.52%), Diptera (1.65 %), Hymenoptera (2.94%) (Fig.3). These 7 orders of insects were almost common in the food contents throughout the year. Among orthopteran Grasshopper, *Melanoplus differntialis* was found throughout the year, which covered 14.22% of the total foods. Order Hemiptera was represented by the Creeping water bug, *Pelocoris femoratus* found only in 4 stomachs. Order Coleoptera was

represented by the Rhinosor beetle 2.80% and found in 54 stomachs. Order Diptera was represented by the Cabbage lopper, *Trichoplusia* sp. found in 22 stomachs. Order Hymenoptera was represented by the Black ant, *Componotus compressus* found in 64 stomachs.

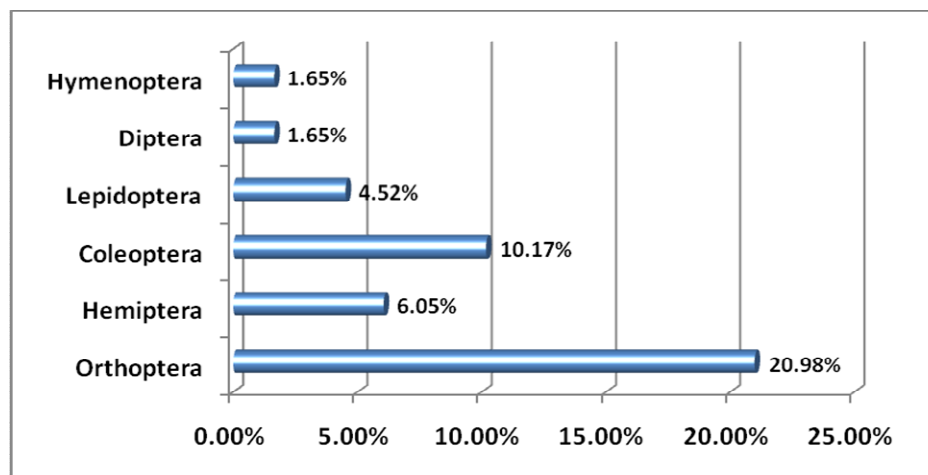


Fig. 3. Food Consumption of *E. cyanophlyctis* in different orders under the class Insecta.

In the present study almost all the specimens of common skittering frog were collected from aquatic and semi-aquatic habitats round the year. Sharma (1995) stated that the species is very common in ditches, mine pits, nullahs, rivers, ponds, wells, forest, nursery tanks, etc. During the rainy season it can be seen on roads at night. He also mentioned that they are found round the year except during the winter. Chakrabarti (1987) mentioned that skittering frogs need a moist environment to prevent their highly sensitive skin from drying out and they live in ditches along the road side, streams and in stagnant water of the paddy fields. Fugler (1982) mentioned the skittering frog was mainly aquatic, inhabiting mostly freshwater wetlands but uncommon in forest areas and coastal regions. It is mostly gregarious and nocturnal, inhabiting in shallow wetlands with aquatic weeds and bushes near permanent water courses and pools (Dutta 1976). The present findings supports to the results of above mentioned researchers.

It was found that common skittering frogs as animal feeders fed on invertebrates and small vertebrate animals. Of the stomach contents insects constituted 57.95% which represented 10 orders and 18 families and the average food consumption was  $5.40 \pm 3.65$ g that was 4.92% of the body weight whereas Joshee (1986) noted that the average weight of the consumed food by each animal was 1.8g. Raj *et al.* (2005) mentioned that insect food constituted (73.1%) of the total foods of *E. cyanophlyctis*. Issac and Rege (1975) found earthworms in frog's stomachs and noted that those were not the regular food items



of the frogs species. Sharifi (2009) mentioned that the skittering frog was insectivorous and feed on aquatic floating insects, insect larvae and other insects from the floating vegetations. Masoni crabs were also found in the stomachs of frogs during the present study. Issac and Rege (1975) also noted that crabs were the next to insects in the diet of *E. cyanophlyctis*. McCann (1933) and Ali (1955) reported that insects damaged the paddy crop during the flowering season of the paddy and hence the frogs should be considered as natural controlling agents of animals harmful to agriculture. Orthopteran species were more-or less regular food items. Issac and Rege (1975) noted that orthopteran species were available during the major part of the year as foods of ranidae. Fugler (1982) and Issac and Rege (1975) reported that *E. cyanophlyctis* feed on Dermapterans and found in the stomachs throughout the year. Hemipteran were found in all the three seasons of the year and was maximum in the month of June and December (Wadekar 1963). Issac and Rege (1975) also found Hemipterans in the stomach of *E. cyanophlyctis*. These findings are in good agreements with the present findings.

It is revealed that Coleopterans was the most preferred food items of skittering frogs. Similar observations have been reported by Fugler (1982) and Ahsan (1983). Issac and Rege (1975) also found Lepidoptera in the frog's stomach. In the present study a good number of young skipping frogs found in their stomachs. This finding is supported by Davidson (1916), Wadekar (1963). Tadpoles of *Bufo* and *Rana* sp. were noted by Issac and Rege (1975) and Joshee (1986). Formicidae is one of the house-hold pests which is a nuisance on trees, leaves, houses, etc. and some of them create pain in the human skin also. Hymenopteran foods in frogs were also reported by Wadekar (1963), Issac and Rege (1975), Fugler (1982), Ahsan (1983). Some gastropods were recorded from the stomach of frogs (Wadekar 1963) but in the present study no gastropods were found.

In the present study it was found that the frog consumed a good number of small fish Titpunti, *Puntius* spp., Mola fish, *Amblyphrayngodon mola*, Darkina fish, *Rasbora daniconius*, Telapia fish fry, *Telapia mosambica*. More or less similar observations were reported by Bhaduri (1945), Joshee (1986), Issac and Rege (1975).

Alam (1992) reported that the consumption of food by frogs varied seasonally, being much less in winter than in summer and in monsoon. These findings are good agreement with the present study. But the percent frequency occurrence of insects in relation to the total number of foods was more or less the same in all seasons. At the beginning of winter consumption was much higher than during the rest of winter. Of the food contents of 75 stomachs of frogs, insects belonged to 18 families and 10 orders, most of which are harmful to agriculture. Sanil and Andrews (1995) mentioned that *E. cyanophlyctis* mostly depended upon Coleopteran, Hymenoptera, Hemiptera, Orthoptera and Hemiptera and Araneida. Most of the insects of these orders are notorious agricultural pests. Therefore, the findings strongly support the positive role to anurans on agro-ecosystem.

### Acknowledgements

The author is gratefully acknowledges Prof. Dr. Sufia Bulbul, Ms. Sharifa Sultana, Ms. Luna Sharmin, Department of Zoology, Dhaka College, Dhaka for their assistance in identifying the insects during the study period.

### References

- Ahasan, M. F. 1983. Study of food items. Stomach analysis of the Indian Bull Frog, *Rana tigrina* Daudin in Bangladesh. *Fisheries Information Bull.* **1**:52-65.
- Alam, S., Sarker, N. J. and Husain, K. Z. 1992. Food Habits of *Rana tigrina* Daudin Bangladesh *J. Zool.* **20**(1): 113-124.
- Ali, I. 1955. Hunting the land crab (*Paratelphusa guerini*). *J. Bombay Nat. Hist. Soc.* **52** : 941-945.
- Benerjee, A. 1954. Food of the bull frog. *J. Bombay Nat. Hist. Soc.* **52**: 639 p.
- Bhaduri, I. L. 1945. The Indian Bull Frog (*Rana tigrina*) Daudin Envmenace to Fishery. *Sci. and Culture.* **11** : 305-306.
- Borror, D. J., DeLong, D. M. 1954. *An Introduction to the Study of Insects*. Holt Rinehart and Winston, United States of America, Library of Congress. 1030 + ix pp.
- Chakrabarti, K. 1987. Conservation of freshwater frogs, *Tiger Paper*, Thailand. **14**(1): 17-18.
- Davidson, N. 1916. Food of skipping frog (*Euphlyctis cyanophlyctis*), *J. Bombay Nat. Hist. Soc.* **25**: 152-153pp.
- Deniel, J. C. 1975. Field guide to the amphibians of Western India, part 3, *J. Bombay Nat. Hist. Soc.* **72**(2): 506-522.
- Dutta, S. K. and Mohanty Hajmadi, P. 1976. Breeding and Life history of Indian Skipping Frog, *Utkal Univ., J. Sci.* **13**(1&2) : 53-59.
- Frost, D. R. 2013. "*Euphlyctis cyanophlyctis* (Schneider 1799)". *Amphibian Species of the World 5.6, an Online Reference*. American Museum of Natural History. Retrieved 16 November 2013.
- Fugler, C. M. 1982. The status of population of *Hoplobatrachus tigrinus* Daudin in Bangladesh. *Fisheries Information Bull.* **1** : 1-51.
- Hartley, P. H. T. 1948. The assessment of the food of birds. *J. Ibis.* **90** : 361 - 381.
- Imams, A. D. 1965. *A General Textbook of Entomology*. 9<sup>th</sup> Edition. Revised by Richards, O. W. and devies, R. G. Butler and Tanner. London. 886 pp.
- Issac, S. and Rege, M. S. 1975. Food of *Rana tigrina*. *J. Bombay Nat. Hist. Soc.* **72** : 157.
- Joshee, A. K. 1986. Food habits of the Indian Skipping Frog (*Euphlyctis cyanophlyctis* Daud.) *J. Bombay Nat. Hist. Soc.* **5**: 498-501.
- Khan, M. S. 1973. Food of the Tiger Frog, *Rana tigrina* (Sci) Daudin. *Biologia (Lahore)*. **19** : 93-107.
- McCann, D. 1933. Notes on Indian batrachians. *J. Bombay Nat. Hist. Soc.* **36** : 161.
- Raj, B. S. 1915. Skipping frog and Rat Snake, *J. Bombay Nat. Hist. Soc.* **23**: 789p.
- Raj, Y. P., Budha, P. B. and Shah, K. B. 2005. Food habits of *Euphlyctis cyanophlyctis* (Daudin, 1802), *Limnonectes nepalensis* (Dubois, 1975) and *Bufo stomaticus* Lütken, 1862 (Amphibia: Anura) in Pokhara Valley, *J. Nat. Hist. Mus.* **22**: 134-139.
- Rao, Y. R. and Cherian, M. G. 1940. Control of the rice grasshoppers, Indian Farming. *J. Bombay Nat. Hist.* **1**: 433-436.
- Saima, Y., Mahmood, T., Rais, M. and Qureshi, I. Z. 2010. Population variation and food habit of Ranid frogs in the Rice based cropping system in Gujranala region, Pakistan, *Asian Herpt. Res.* **1**(2):123-130.

- Sanil, G. and M. I. Andrews. 1995. Food and Feeding habits of *Rana hexadactyla* Lesson, *J. Bombay Nat. Hist. Soc.* **92**: 220-224pp.
- Sharifi, M. 2009. "*Euphlyctis cyanophlyctis*". *IUCN Red List of Threatened Species. Version 2013.1*. International Union for Conservation of Nature. Retrieved 16 November 2013.
- Sharma, S. K. 1995. Amphibians of Phulwarikinal Wildlife Sanctuary, India. *J. Bombay Nat. Hist. Soc.* **92**: 271-272pp.
- Singhi, D. R. K. 1940. Frog eating a snake. *J. Bombay Nat. Hist. Soc.* **42**:200-201.
- Wadekar, D. L. 1963. The diet of Indian Skipping Frog (*H. tigerinus*), *J. Bombay Nat. Hist. Soc.* **60**:263-268.

(Received revised manuscript on 1.3.2015)