International Journal of Fisheries and Aquatic Studies 2015; 2(4): 147-152

ISSN: 2347-5129
IJFAS 2015; 2(4): 147-152

www.fisheriesjournal.com
Received: 12-01-2015
Accepted: 15-02-2015

B. Laxmappa
Fisheries Development Officer, Mahabubnagar-509001, Telangana, India.

Savalla Murali Krishna
Asst. Director of Fisheries, O/o the Director of Fisheries, Telangana, Hyderabad-500028, India.

Correspondence
Savalla Murali Krishna
Asst. Director of Fisheries, O/o the Director of Fisheries, Telangana, Hyderabad-500028, India.

Polyculture of the freshwater prawn *Macrobrachium malcolmsonii* (H.M. Edwards) in Koilsagar reservoir of Mahabubnagar district (TS), India

B. Laxmappa, Savalla Murali Krishna

Abstract
Freshwater prawn culture has now occupied a significant position in inland aquacultural practices in India. Culture of freshwater prawns along with major carps has been practiced in limited reservoirs and Koilsagar is one of them. Koilsagar is a medium size reservoir in Telangana State (TS) of India and was constructed in 1955 across the Peddavagu stream which is tributary of Krishna River in Mahabubnagar district. Five villages exist in the vicinity of the reservoir and organized the Fishermen Cooperative Society in the name of the reservoir during the year 1977 by the Fisheries Department. By the initiation of the department, the reservoir fishermen has started to stock prawn seed ever year along with fish seed of major carps to augment the production. The fishermen of this reservoir succeeded in prawn production besides fish. The present paper deals with the production of the freshwater prawn, *Macrobrachium malcolmsonii* (H. M. Edwards) in polyculture system from the Koilsagar reservoir of Mahabubnagar district.

Keywords*:* Koilsagar Reservoir, Mahabubnagar, Polyculture, Freshwater prawn.

1. Introduction
Freshwater prawn culture has great potential for rural aquaculture, generating considerable employment and income for rural and poor people. Freshwater prawn farming is environmentally sustainable, since it is practiced at low stocking density (New, 1995). Freshwater prawn culture has attracted more attention in the recent years due to its export potential and increasing demand as good protein. India is the second largest contributor of freshwater prawns to the World market. Freshwater prawn culture has undergone a phenomenal growth in the past two decades. Freshwater prawns are important in the capture and culture fisheries and are extensively distributed in freshwater and estuaries of the World mostly in tropical and subtropical areas. Freshwater prawn culture is an aquaculture business designed to raise and produce freshwater prawn for human consumption. The main freshwater prawn producers are China, India, Vietnam, Thailand, Taiwan and Bangladesh.

In India the largest species that are of interest for aquaculture are *Macrobrachium rosenbergii*, *M. malcolmsonii* and *M. gangeticum* respectively. The latter two species are indigenous and can be farmed in monoculture [2, 9, 11] or in polyculture with compatible carps [1, 2, 5, 11, 12, 13]. *M. rosenbergii* is the prawn preferred by farmers and is cultivated commercially in certain parts of the country. However, *M. malcolmsonii* is cultured traditionally in larger open waters.

Species of the freshwater prawn's genus *Macrobrachium* are distributed throughout the tropical and subtropical zones of the World. They are found in most inland freshwater areas like lakes, rivers, swamps, irrigation channels, canals and ponds as well as estuarine areas. Freshwater prawn farming is popular in South East Asian countries, but it has not gained much progress in India until recently, although freshwater prawns are a high priced product and have a high market demand in both domestic and export markets (Radheyshyam, 2009).

Freshwater prawn production in India that includes farming and wild capture of the giant freshwater prawn, *Macrobrachium rosenbergii* and the monsoon river prawn, *M. malcolmsonii* has increased steadily since 1999 reaching a peak output of 42 780 tonnes in 2005, but then declined to 6568 tonnes in 2009–2010 [8]. The impounded freshwater bodies in the various states of India offer immense potential for freshwater prawn culture.

2. Materials and Methods

Koilsagar is the medium size irrigation project located at Koilsagar (Bollaram) village, Devarkadra Mandal of Mahabubnagar district in Telangana State **(Fig. 1 & 2)**. It is about 12 Kms away from the Devarkadra Mandal headquarters in between Mahabubnagar and Raichur districts and about 132 Kms away from Hyderabad. The salient features of Koilsagar Reservoir are furnished in **Table 1**.

Table 1: Salient Features of Koilsagar Reservoir

Attribute	Value
Location of the Reservoir	Longitude : 77° – 45’ Latitude : 16° – 44’
Year of construction	1955
Catchments Area	709 Sq. miles.
Water Spread Area at FRL	1036 ha.
Water Spread Area at DSL (at sill level)	466 ha.
Length of Dam	1036.40 m.
Water level	32.5 Feet.
Water Source	Monsoon run-off
Type of Dam	Gravity + Masonry
Purpose	Irrigation + Drinking water

Source: National Register of Large Dams.

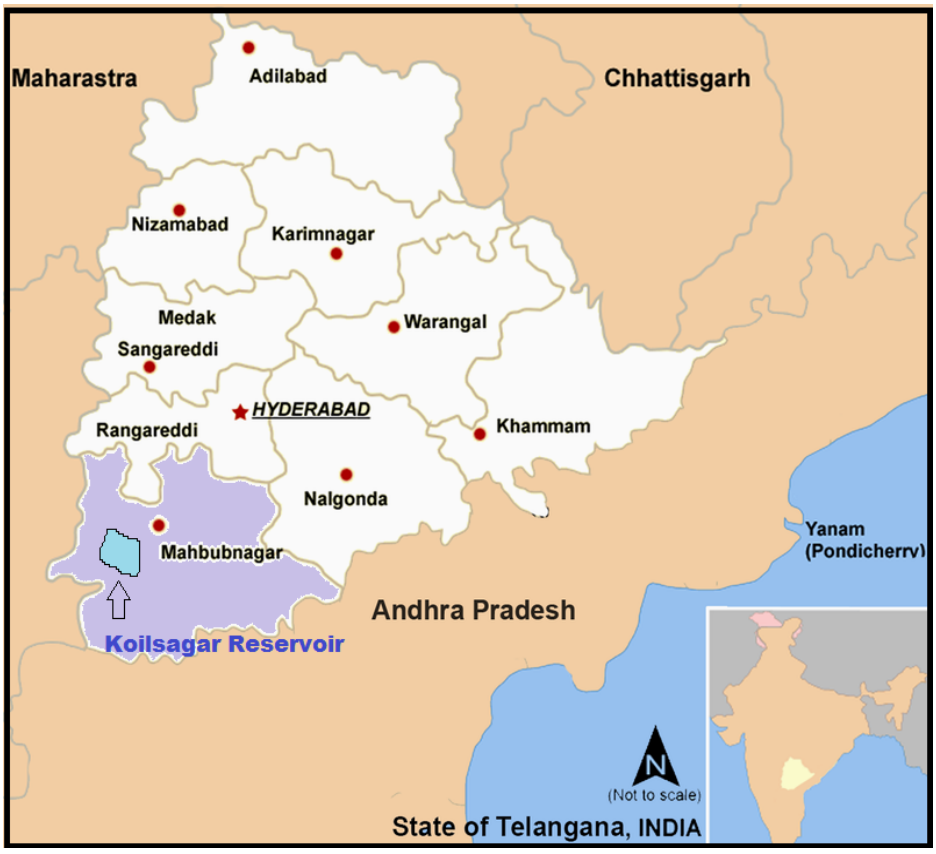

Fig 1: Location of Koilsagar Reservoir in Mahabubnagar District of Telangana state, India

Fig 2: A view of Koilsagar Reservoir in Mahabubnagar District

Though the Koilsagar Reservoir was constructed primarily for irrigation purpose, the fishery is evolved as the secondary activity for providing livelihood to fisher folk. Till the year 1975 only limited fishermen of about 30 to 40 from nearby villages were used to catch naturally available fish species in Koilsagar reservoir and catches were also not significant. In the year 1977 the five villages which were existing in the vicinity of the reservoir organized the Fishermen Cooperative Society in the name of the reservoir by the Fisheries Department and started regular fishing in the reservoir. Presently, more than 600 fishermen's families are partially dependent on reservoir for their livelihood from the 5 villages which are existing in the vicinity of the reservoir.

Study Area: Present work has been conducted to study on freshwater prawn *Macrobrachium malcolmsonii* polyculture in Koilsagar Reservoir. And also observed year-wise prawn growth and yield from 2012 to 2014. The prawn was collected mainly by using a cast net with the assistance of reservoir fishermen for observation of its growth. A discussion was also made by the reservoir fishermen to collect the prawn catch particulars from the reservoir regularly. Prawn seed stocking and year-wise prawn catching particulars collected regularly from 2012 to 2014 (**Table 2**).

Table 2: Year-wise prawn production trends in Koilsagar Reservoir

Year	Seed stocking (in Lakhs)	Prawn Production (in tonnes*)	Production per Ha. (in Kgs.)
2011-12	11.00	10.25	9.89
2012-13	10.00	12.16	11.74
2013-14	10.00	9.68	9.34

Tonne = 1000 Kilograms

3. Results and Discussion

The fishermen were made the first attempt during the year 2002-03 and stocked prawn seed of natural collection from Godavari River in Andhra Pradesh (Laxmappa *et al*, 2014). The wild prawn seed mainly consists of *Macrobrachium malcolmsonii* and other miscellaneous species, including very limited part of *Macrobrachium rosenbergii* species. Among this, *M. malcolmsonii* grown well and got good production, which encouraged the fishermen to regular stocking of prawn seed every year in the month of August or September along with fish seed.

Generally, prawn harvesting takes place 20-30 days as a whole every year in the months of April to June every year when the water level of the reservoir recedes. In the year 2012-13 got good prawn production of 12.16 tonnes along with fish production. Among the total yield of the prawn < 50 gram size is about 65% and > 50 grams size is 35%. The prawn production was also declined to 9.68 tonnes in 2013-14 **(Table 2 & Fig. 6)**.

Fig 3: Natural prawn juveniles for stocking in Koilsagar Reservoir

Fig 4: Harvested prawn from the Koilsagar Reservoir

Fig 5: Differential growth of prawn from the Koilsagar Reservoir

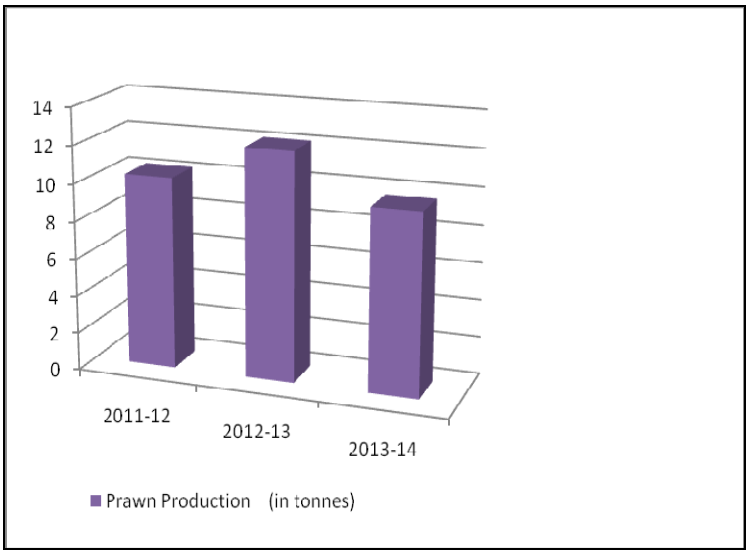

Fig 6: Prawn production trends of Koilsagar Reservoir from 2011-12 to 2013-14.

Stocking *M. rosenbergii* post larvae in Malampuzha reservoir in Kerala has yielded significant results [4]. Freshwater prawn production in a polyculture system varies according to level of management, but ranges from 10 - 83 kg/ha/year [14] (Thangadurai, 1992 and Laxmappa, 2014). In addition to the prawns, various carp can be also produced under this system. There is no uniform growth in freshwater prawn and the harvest sizes range from 40 g to 110 g each. This is due to seed quality and quantity of stocking in the reservoirs.

Extensive prawn polyculture was practiced in Koilsagar reservoir with fast growing compatible carps such as catla (surface feeder) and rohu (column feeder). Stocked naturally at very low stocking density with prawn juveniles collected from wild sources. In this culture system water quality, prawn growth and health was not monitored. Supplementary feeding and organic fertilizers were not applied. Hence, prawn production was also limited to about 10-12 kg/ha/year and fish production was about 75-90 kg/ha/year in polyculture system.

4. Conclusions

Reservoirs are the vast water bodies. There is a vast scope for freshwater prawn culture possibility in India, particularly in reservoirs and irrigation tanks, but only in certain pockets where freshwater prawn culture is practicing and only few farmers are concentrating regularly. Koilsagar is one of the best managed medium sized reservoirs in the Telangana state for prawn production along with fish. The achievement is only due to the management practices like good seed stocking, collective harvesting and control of poaching by the license holders regularly. Still, there are vast opportunities are existing for increasing of productivity from the reservoir. The improved fishery in the reservoir should also include interventions that aim at increasing the capacity of fisher folk communities in low-cost technologies and curtail post-harvest losses. Timely and quality prawn seed stocking is required to augment the production levels.

5. Acknowledgement

The cooperation provided by the fishermen of Koilsagar reservoir in data collection during the field visits is greatly acknowledged.

6. References

1. Durairaj S, Umamaheshwari R. Polyculture of freshwater prawn *Macrobrachium malcolmsonii* (H. Milne Edwards). Proc. of National. Symp. On New Horizons in freshwater Aquaculture, CIFA, Bhubaneswar 23-25 January, 1991, 244-245.
2. Kanaujia DR Mohanty AN, Prospects of both mono and mixed culture of *Macrobrachium malcolmsonii*. Fishing Chimes 1996; 15(12):33-35.
3. Kanaujia DR, Mohanty, Tripathi SD. Growth and production of Indian River prawn *Macrobrachium malcolmsonii* (H. Milne Edwards) under pond culture. Aquaculture 1997; 154:79-85.
4. Kutty MN, Nair CM, Salin KR. Reservoir fisheries of freshwater prawn – success story of an emerging culture-based giant freshwater prawn fishery at Malampuzha Dam in Kerala, India. Aquaculture Asia Magazine; April-June, 2008, 40-41.
5. Langer RK, Somalingam J. Experimental culture of freshwater prawn in ponds at Powerkheda, Hoshangabad. Proc. of Third Indian Fisheries Forum, 11-14 October, Pantnagar, UP, 1993, 65-66.
6. Laxmappa B, Jithender KNS, Vamshi S. Augmentation of fish and prawn production from Koilsagar reservoir of Mahabubnagar: A success story. International Journal of Fisheries and Aquatic Studies 2014; 2(1):197-206.
7. Laxmappa B. Freshwater prawn farming in reservoirs Telangana, India. Aquaculture Asia Pacific Magazine 2014; 10(6): 38-39.
8. Nair CM, Salin KR. Current status and prospects of farming the giant river prawn Macrobrachium rosenbergii (De Man) and the monsoon river prawn Macrobrachium malcolmsonii (H.M. Edwards) in India. Aquaculture Research 2012; 43(7):999-1014.
9. Mukhopadhyay SK, Sarangi N. Survival, growth and production of freshwater prawn *Macrobrachium malcolmsonii*. Environ. Ecol 1985; 3(2):198-201.
10. New MB. Status of freshwater prawn farming: a review. Aquaculture Research 1995; 26:1-54.
11. Radheyshyam DR, Kanaujia Mohanty AN. Growth and yield of *Macrobrachium malcolmsonii* and carps in mono and poly culture under different stocking size of carps in

rural area (Communicated for publication), 2008
12. Rashid A, Behera M K. Culture of freshwater prawn in undivided Sambalpur District of Orissa. Fishing Chimes 1998; 18(7):20-23.
13. Reddy R, Ramakrishna R, Rao KG. Polyculture of *Macrobrachium malcolmsonii* (Milne Edwards) and Asiatic carps. Proc. of the First Indian Fisheries Forum, Mangalore, Karnataka, 1988, 21-23.
14. Thangadurai AJ. Culture of freshwater prawn *Macrobrachium malcolmsonii* in Tamil Nadu - A case study. Proc. of the National Symp. On Freshwater Prawns (*Macrobrachium* spp.), Kerala Agricultural University, Kochi, 1992, 187-188.