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RESEARCH ARTICLE

DISTRIBUTION OF MAJOR CARP FISHES IN MINOR RESERVOIRS: A CASE STUDY OF NAGULAKUNTA WATER TANK, VINJAPALLY OF SIDDIPET DIST. TELANGANA STATE

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ABSTRACT

The present study based on the data for 5 years deals with the role of a minor reservoir in fish production and the influence of stocking densities on fish production. Nagulakunta, a minor reservoir with 10 ha of water spread is located in Vinjapally village of Siddipet District. The minor reservoir is treated as stocking and capture system for development of the fisheries. The overall major carp production is 465.88kg/ha/yr, and that of the rest being 56.25kg/ha/yr. The total fish production is 513.13kg/ha/yr. The major carp production increased significantly from 13.43 to 98.02%, and that of others decreased drastically from 86.57 to 1.98%. The major carp seed (20 - 40mm fry) alone was stocked in the reservoir with overall stocking rate of 5892 fry/ ha/ yr. The major carp production considerably increased with stocking and the maximum yield of carps was recorded at a stocking density of 8500 fry/ha/yr. It is concluded that Nagulakunta is productive reservoir in terms of fish production.

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INTRODUCTION

Aquaculture has acquired special significance not only because of its contribution to food resources but also for its contribution to the quality of our diet. Aquaculture can be practiced in lentic water Including reservoirs, lakes, ponds and ditches. Out of these the reservoirs are large water bodies and good source for fish culture. Indian reservoirs, being in tropics, have high primary productivity and have the capacity to produce more fish yield. Minor reservoirs are amenable to more effective fisheries management than that of large reservoirs (Jhingran and Sugunan, 1990; Devi, 1997; Piska, 1999 and 2000). The state of Telangana is blessed with 36000 water tanks. In these tanks some are major reservoirs and rest of tanks are minor reservoirs. The fish yield of minor reservoirs is higher than that of large ones. The present study is undertaken to know the role of minor reservoirs in the fish production and the influence of stocking of seed on the fish production in a minor reservoir, Nagulakunta of Siddipet Dist.

MATERIALS AND METHODS

Nagulakunta is a small irrigation tank with water spread area of 10 ha, is located in Vinjapally village in Siddipet.

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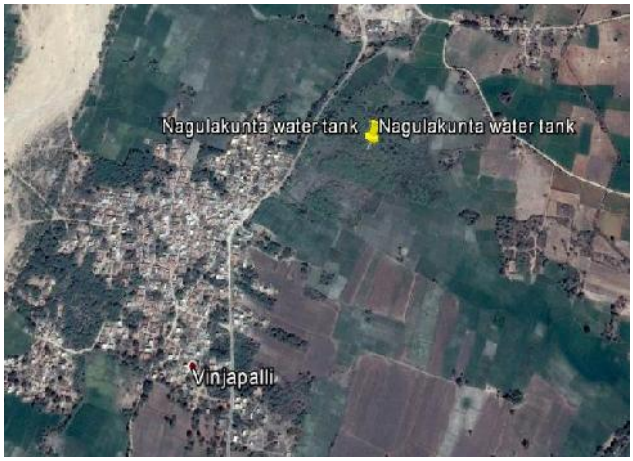
Longitude and latitude: 18 ^{o} 12" 16, 56" N -79^{o} 05" 20 .14" E The present study is based on the data of 5 years from 2009-10 to 2013-14. Only major carp seed, catla, rohu, and mrigal, common carp and grass crap seed (20- 40mm fry) were stocked in the reservoir. Nagula kunta minor reservoir is owned by Gram panchayath and leased out to Primary Fishermen Co-operative Society, Vinjapally. The mean depth is 2.2.m. It is constructed with stony embankment. Dragnets, cast nets and gill nets were used for harvesting. The level of exploitation is partial. The physico-chemical parameters were estimated as per APHA (2012) and updated.

RESULTS

Twelve species of fishes were found in the tanks. Majority of species belong to order cypriniformes. Three species of major carps (Cypriniformes), two species of carp minnows (Cypriniformes), two species of murrels (Channiformes), two species of cat fishes (Siluriformis) and four species of other fishes(one species of Mastacembeliformes and two species Perciformes and one species of Cyprinodontiformes were identified in the tanks. Based on their food and feeding habits, the fishes of tanks can be categorized into herbivores, carnivores, omnivores and planktonvores. The abundance of ichthyofauna in the tanks is depicted. The most abundant fishes were only the major carp like catla throughout study period. Rohu, Common carp, silver fish (bacaila), spotted and striated murrels, magur, singhi were less abundantly found in the tanks.



Parameters	Average Value
pH	8.3
Carbonates mg/1	129.5
Bicarbonates mg/1	43.1
Dissolved oxygen mg/1	7.2
Calcium mg/1	82.61
Magnesium mg/1	47.90
Nitrate mg/1	0.4
Phosphate mg/1	0.19
Total dissolved solids mg/1	289.2
Turbidity FU	22.42

The stocking densities and the species-wise composition during 2009-10 to 2013-14. The stocking density was gradually increased with the maximum during 2009-10 (1500 fry/ha). Among the varieties, catla was stocked maximum (32.21%) followed by rohu (28.70%), mrigal (17.35%); common carp (16.59%) and grass carp (5.15%). The density over 5years ranged from 500 to 1500 fry/ha/yr (average of 892 fry). The major carps production in the reservoir ranged from 457.50 (13.43%) to 22817.50 (97.26%) kg . This yield gradually increased up to 2009-10 and there after a fall was observed. The fish yield ranged from 18.30 to 912.70 kg/ha/ yr (average 456.88kg). Maximum amount of fish production was observed in case of catla. Stocking density and its percentage composition in Nagulakunta minor reservoir during 2009-10 to 2013-14 an average of 154.40 kg/ha/yr), which was followed by rohu (22.52% and an average of 102.87 kg/ha/yr), common carp (21.02% and an average of 96.02 kg/ha/yr), mrigal (17.56% and an average of 80.21 kg/ha/yr) and grass carp (5.12% and an average of 23.38kg/ha/yr).

The size range of carps was 550-1210 kg at the time of harvesting. The number of fry required for the production of one-kilogram fish ranged from 9.31 to 39.68. Fishes other than major carps were also harvested every year. Their yield ranged from 16.85 to 117.92 kg/ha/yr during 2006-07 and 2008-09 respectively with an average of 230 kg/ha/yr. The fish yield increased gradually from 2008-09 to 2012-13.The total production of fishes both major carp and miscellaneous fishes in the year. Carps yield and its percentage composition in Nagulakunta minor reservoir during 2009-10 to 2013-14. Fish yield in Nagulakunta minor reservoir during 2009-10 to 2013-14 reservoir were 513.13 kg/hr/yr. The share of miscellaneous fishes decreased significantly from 86.57% to 1.98% during 2009-10 to 2013-14 respectively. The ratio between major carps and other fishes in the reservoir ranged from 0.16 to 49.62 with an average of 8.12. This ratio increased gradually from 2009-10 to 2013-14.

DISCUSSION

The physico-chemical parameters indicate that Nagulakunta water tank is highly productive. Based on studies on limnology and fisheries, Nagulakunta is a highly productive reservoir. Stocking of quality fish seed in adequate numbers is one of the prerequisites in reservoir fishery management.
Various authors have suggested different stocking densities. Srivastava (2001) recommended 1000 fingerlings / ha in minor reservoirs. Agarwal (1990) suggested the stocking densities of 2000 fry/ha/yr for minor reservoir with water spread area of 10-100 ha and 1000 fry/ha/ yr for small reservoirs with water spread below 10 ha. The present average stocking density of 2000 fry/ha/yr is much higher (almost 3 times) than the recommendations of Agarwal (1990) Laxmappa (2015).

During the present study the maximum stocking density was 2000 fry/ha/yr in 1998-'99, which is almost 5.5 times more than the recommendation of Agarwal (1990). This indicates that the stocking rates are very high and not on par with recommendation. However the yield significantly increased. Lorenzen (1994) reported that the optimum size of t h e fish seed is an important factor in the management of minor reservoirs. The size of fry at the time of release into the reservoir ranged from 20 to 40 mm. This is not at par with the size of 12.5 cm recommended for stocking by Srivastava (1985) and 10-15 cm suggested by Jhingran (1991). Due to the introduction of small sized fry, the stocking rate was increased to compensate the mortality of fry. The present study indicates that continuous stocking of major carp seed had been instrumental in raising fish production to a level of 912.70 from 18.30kg/ha/yr with an average of 456.88 kg, which is quite a phenomenal increase. The major carp share in the landings has increased considerably from a very insignificant position of 13.43% to 98.02%. The fish production in the present study is much higher than Indian minor reservoir average fish production of 49.9kg/ha/yr and Indian reservoir average fish production of 20-25 kg/ha/yr (Piska, 1999and 2000) and minor reservoirs of Haryana Ravi Shankar Piska 122 (Agarwal, 1990). The present productivities are higher than other minor reservoirs like Baghla -106 kg/ha/yr, Bachhra -139 kg/ha/yr and Gularia -100 kg/ha/yr, which were managed by scientific methods (Jhingram and Sugunan, 1990). Piska and Khan (1999) reported the fish production of 367.57 kg/ha/yr in the Ibrahimbagh, adjacent reservoir of Shathamraj in Hyderabad. The fish production increased gradually with the increase of stocking density. After the saturation point, i.e., very high or over stocking, the fish production decreased.

Devi (1991) and Piska and Khan (1999) reported the increase of fish production with increase of stocking in Ibrahimbagh. They reported that the fish production increased from 346.44 to 388.70 kg/ha/yr with the stocking density from 4100 to 4800 fry/ha/yr during 1993-'94 to 1994-'95. Due to the stocking of major carps, their yield increased considerably. Over stocking of the seeds results in the decline of the production in last two years. This may be due to the competition for space and food in the reservoir and indicates that Optimal stocking is required for better returns. In the present study, stocking 2000 fry/ha/yr had yielded up to the maximum (912.70 kg/ha/yr), then the yield decreased due to the over stocking. The present study substantiates the importance of stocking minor reservoirs for augmenting fish yield. Though stocking of advanced fingerlings of around 10cm size is recommended, nursery space will not be sufficient to rear the seed to the required size. Further, ready to stock size seed might not be available in commercial quantities. Under such circumstances stocking of fry is suggested to achieve higher production.

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Summary

The fish community in tanks includes the native species and the introduced species for the purpose of fish production. The present study is the first to documentation of Ichthyofauna in the Nagulakunta tank of Siddipet district in Telangana state. This study should open a new ways for incoming Ichthyofaunal research. Sustainable fish production by taking appropriate steps for sustaining fish diversity is necessary to conserve these vulnerable resources. This water tank is very productive and the physic chemical parameters are in permissible limits. cypriniformes and channaformes were dominated. Supplementary feed is better than from natural feed for good growth.

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