Indian J. Fish., 61(1) :128-130, 2014

Note

Effect of carp pituitary extract dose and latency period combinations on the stripping response of *Clarias batrachus* (Linnaeus, 1758) during induced spawning operation

S. K. SAHOO, S. S. GIRI AND M. PARAMANIK

Central Institute of Freshwater Aquaculture, Kausalyaganga, Bhubaneswar – 751 002, Odisha, India
email: sahoosk0@gmail.com

ABSTRACT

The stripping response of *Clarias batrachus* was evaluated at five doses of carp pituitary extract (10, 20, 30, 40 and 50 mg kg^{-1} body weight of female) administration in combination with five latency periods (11, 14, 17, 20 and 23 h). The females did not respond to stripping when injected 10 and 20 mg pituitary dose and stripped respectively at 11-14 and 11 h latency period. A significant ($p<0.05$) increase in stripping response was observed with increase in hormone doses beyond 30 mg when stripped at 11 h latency. The stripping responses in 30-50 mg pituitary extract at 14-17 h latency were highest and did not vary significantly. Prolonging the latency period beyond 17 h at 30-40 mg pituitary dose also did not affect the stripping response. While stripping the females at 50 mg dose with 20-23 h latency combinations, the stripping response declined. The experiment clearly suggests that stripping response was the best at 14-23 h latency in combination with 30-40 mg pituitary dose.

Keywords: *Clarias batrachus*, Latency period, Pituitary extract, Stripping response

Among the clariids, *Clarias batrachus* has great importance as a candidate species for commercial aquaculture in Indian sub-continent. Captive breeding followed by seed rearing of this species in hatchery is considered as a dependable source of seed availability, compared to wild collection. Hormones from different sources have been tried for breeding of fish in hatchery (Lin and Peter, 1996). However, pituitary extract is always well preferred for its low cost. Successful induced breeding of this catfish species has been reported with the use of pituitary extract as an inducing agent (Rao and Ram, 1991; Goswami and Sarma, 1997). The success of induced breeding depends on the type of hormone used and its potency, dose of hormone as well as maturity status of the fish. The success also depends on the latency period, which has been discussed for several species (Hogendoorn and Vismanas, 1980; Legendre and Oteme, 1995; Legendre *et al*., 2000). Different parameters related to induced breeding of *C. batrachus* have been discussed by several researchers considering latency and pituitary dose combinations (Rao and Ram, 1991; Goswami and Sarma, 1997), where the stripping response has not been evaluated. The present study attempted to evaluate the stripping response of *C. batrachus* at variable pituitary dose and latency period combinations during induced breeding of the species.

C. batrachus broods were raised in cement tanks of Central Institute of Freshwater Aquaculture, Kausalyaganga, Bhubaneswar, India. The fishes were regularly fed at 2% of their body weight with laboratory made pellet feed, containing 30% crude protein and 3.5 Mcal gross energy per kg feed. Female *C. batrachus* of 120 ± 8.37 –138 ± 5.83 g (mean ± SE) size were selected for induced breeding during monsoon (July - August). The females with soft distended belly and uniform shiny intra-ovarian oocytes were chosen. Five doses of carp pituitary extract (10, 20, 30, 40 and 50 mg per kg female body weight) and five latency periods (11, 14, 17, 20 and 23 h) were considered in twenty-five (5 x 5) different combinations. Five females were used in each combination. The body weight of each female was recorded before injecting the hormone. The females were injected with selected doses of carp pituitary extract (CPE) and kept separately in tubs (100 l) provided with flow-through water till the desired latency period. The females of each combination were hand stripped and eggs were collected individually in pre-weighed plastic petriplates. The weight of stripped eggs of each specimen was recorded. The female was operated to get the spent ovary and the weight was recorded. The stripping response was calculated as: weight of stripped egg/(weight of stripped egg + weight of stripped ovary). Five observations were recorded for each dose and latency period combinations and used for statistical analysis.

The statistical analysis of data was performed using two way ANOVA (Snedecor and Cochran, 1967), which included effects due to CPE doses and latency periods. Treatment effect was considered significant at $p<0.05$.

The stripping response at various doses of pituitary extract and latency period combinations is presented in Table 1. The females did not respond to stripping, when injected 10 and 20 mg pituitary and stripped respectively at 11-14 and 11 h latency periods. This lack of response in females to stripping could be due to insufficient gonadotropin at these dose levels, leading to

Table 1. Effect of different doses of carp pituitary extract and latency periods on the stripping response of *C. batrachus* during induced breeding operation.

Latency period (h)	Pituitary dose (mg) per kg of body weight				
	10	20	30	40	50
11	0_w^c	0_x^c	$0.16 \pm 0.06_w^b$	$0.43 \pm 0.01_w^a$	$0.43 \pm 0.01_w^a$
14	0_w^c	$0.16 \pm 0.06_w^b$	$0.63 \pm 0.01_v^a$	$0.63 \pm 0.46_v^a$	$0.63 \pm 0.01_v^a$
17	$0.06 \pm 0.03_w^c$	$0.40 \pm 0.86_v^b$	$0.62 \pm 0.01_v^a$	$0.63 \pm 0.01_v^a$	$0.61 \pm 0.04_v^a$
20	$0.15 \pm 0.06_v^c$	$0.45 \pm 0.01_v^b$	$0.64 \pm 0.01_v^a$	$0.64 \pm 0.01_v^a$	$0.50 \pm 0.03_w^b$
23	$0.17 \pm 0.07_v^c$	$0.42 \pm 0.01_v^b$	$0.64 \pm 0.04_v^a$	$0.60 \pm 0.01_v^a$	$0.45 \pm 0.01_w^b$

Different superscripts in a row differ significantly ($p<0.05$).
Different subscripts in a column differ significantly ($p<0.05$).

ovulation failure. The ovulation failure due to insufficient gonadotropin release has also been reported in other species (Tan-Fermin *et al*., 1997). A steady increase in stripping response was observed with increase of hormone doses beyond 30 mg dose and stripped at 11 h latency. This increase of pituitary dose might be responsible for smooth stripping, which resulted in higher response compared to lowest dose and latency combination. Similar significant ($p<0.05$) increase of response in stripping was also observed while increasing latency period beyond 14 h at lowest dose of pituitary. While undertaking breeding of *Macquaria ambigua***,** Rowland (1983) reported that longer latency period was required at sub-threshold dose of hormone during induced ovulation, compared to that of threshold or above-threshold doses. The stripping response in 30-50 mg CPE in combination with 14-17 h latency did not vary significantly. The response also did not vary between 30 and 40 mg pituitary dose while prolonging the latency period to 20-23 h, and this could be due to smooth stripping of females. Goswami and Sarma (1997) also reported higher egg output while stripping the female at 17 h post-injection in combination with 30-50 mg pituitary dose. Goswami and Sarma (1997) and Sahoo *et al*. (2008) reported high fertilization of the eggs obtained from 30-50 mg pituitary dose in combination with 17 h latency period. Hence high quality of the eggs can be predicted, which are obtained with good stripping response. But in the present study, the stripping response declined significantly ($p<0.05$) while stripping the females at 50 mg pituitary dose with 20-23 h latency combinations. This decline in response might be due to egg plugging in genital aperture during stripping, resulting in less weight of stripped eggs. Similar declined response was observed in this species of catfish while using higher dose of synthetic hormone in a separate study during induced breeding operation (Sahoo *et al*., 2005).

The results of the study clearly indicates that female *C. batrachus* can be smoothly stripped at 30-40 mg pituitary dose in combination with 14-23 h latency. This observation will be of value, while undertaking induced breeding operations in captive condition.

Acknowledgements

The authors are thankful to the Director, Central Institute of Freshwater Aquaculture, Kausalyaganga, Bhubaneswar, India for providing the facilities during the experiment.

References

Goswami, U. C. and Sarma, N. N. 1997. Pituitary dose optimization for induced ovulation, *in-vitro* fertilization and production of normal fry of *Clarias batrachus* (Linn.). *Asian Fish. Sci*., 10: 163-167.

Hogendoorn, H. and Vismanas, M. M. 1980. Controlled propagation of the African catfish *Clarias lazera* (C and V). II. Artificial reproduction. *Aquaculture,* 21: 39-53.

Legendre, M. and Oteme, Z. 1995. Effect of varying latency period on the quantity and quality of ova after hCG-induced ovulation in the African catfish, *Heterobranchus longifilis* (Teleostei, Clariidae). *Aquat. Living Resour*., 8: 309-316.

Legendre, M., Slembrouck, J. J., Subagja and Kristanto, H. 2000. Ovulation rate, latency period and ova viability after GnRH - or hCG-induced breeding in the Asian catfish *Pangasius hypophthalmus* (Siluriformes, Pangasidae). *Aquat. Living Resour*., 13: 145-151.

Lin, H. R. and Peter, R. E. 1996. Hormones and spawning in fish. *Asian Fish. Sci*., 9: 21-33.

Rao, G. R. M. and Ram, K. J. 1991. An effective dose of pituitary for breeding *Clarias*. *J. Aquacult. Trop*., 6: 207-210.

Rowland, S. J. 1983. The hormone-induced ovulation and spawning of the Australian freshwater fish golden perch, *Macquaria ambigua* (Richardson) (Percichtyidae). *Aquaculture,* 35: 221-238.

Sahoo, S. K., Giri, S. S. and Sahu, A. K. 2005. Induced spawning of Asian catfish, *Clarias batrachus* (Linn.): effect of various latency periods and SGnRHa and domperidone

doses on spawning performance and egg quality. *Aquacult. Res*., 36: 1273-1278.

Sahoo, S. K., Giri, S. S. and Chandra, S. 2008. Effects of latency periods and injection doses with carp pituitary extract on spawning performance and egg quality of Asian catfish *Clarias batrachus* (Linn.). *J. Appl. Aquacult*., 20: 295-303.

Snedecor, G. W. and Cochran, W. G. 1967. *Statistical methods*. Ames, Iowa State University Press.

Tan-Fermin, J. D., Pagador, R. R. and Chavez, R. C. 1997. LHRHa and pimozide-induced spawning of Asian catfish *Clarias macrocephalus* (Gunther) at different times during an annual reproductive cycle. *Aquaculture,* 148: 323-331.

Date of Receipt : 21.01.2013
Date of Acceptance : 26.08.2013