CONSOLIDATED DISCUSSION AND CONCLUSION

Owing to the repeated findings discussed in this thesis, it could be suggested that climbing perch can assess and attribute values to different stimuli perceived, and can make decisions based on the expected benefit (Binoy and Thomas, 2004; 2006). This fish was found to be an excellent decision maker in two major contexts of decision making analysed: the shoal selection a (binary choice situation) and exploration of a novel area (taking a risky decision).

When presented with a combination of familiar and unfamiliar shoals with variation in size, the climbing perch decided to join with the larger shoal, a decision reported in many fish species (Morrel et al. 2007). This result reveals a determinant role of shoal size and the benefit obtained by the fish in joining a large group, on the shoaling decision of this species. Though, preference for larger shoal over smaller one is an instinctive behaviour, the factor familiarity was found to be strong enough to influence the decision making ability of this species. The climbing perch was able to distinguish familiar individuals from unfamiliar ones, as well as familiar shoal from unfamiliar shoal (Binoy and Thomas, 2004; 2006). Moreover, they preferred to join with the familiar individual or the shoal, over unfamiliar individual or shoal. However, the full-fledged effect of familiarity on the decision making was expressed only when the size of familiar shoal was equal to that of unfamiliar shoal. In all other situations, the decision was biased towards the larger shoal and trading off point between familiarity and shoal size was 1:1.9 (familiar shoal: unfamiliar shoal).

In climbing perch, the shoaling decisions were always biased towards conspecifics; but experience for a longer duration with heterospecific can bring on
familiarity with it, and the familiarity thus formed can influence the shoaling decision. Interestingly, only the heterospecifics, having a shape similar that of conspecific was able affect the decision making ability on the basis of acquired familiarity. However, the heterospecific with a body shape different from that of conspecifics failed to induce familiarity in climbing perch, as well as to influence their shoaling decision. Hence, it could be suggested that the experience for a long period can induce familiarity based decision bias in this species, if the other factors (for example, shape of the heterospecific) favour the familiarity acquisition mechanism.

Familiarity can affect the propensity to take a risky decision (boldness) by climbing perch, a phenomenon reported in many other fish species (Iguchi, 2001; Yoshida et al., 2005; Vilhunen et al., 2008). The latency to take a risky decision reduced significantly when the fish became familiar with the situation.

The boldness in this species seems to be a genetically determined trait. The basis of such a hypothesis is that, this fish exhibited a consistent level of boldness in different contexts and even in presence of biologically significant fear evoking stimulus like predator. Moreover, development in a homogenous environment without having any experience with external cues for one year failed to influence the propensity to take a risky decision, supporting the genetic determination of boldness in this species.

However, some external factors were found to influence the decision making ability of this species. For example, a novel object simulating an eyespot, as well as microhabitat with substratum made of cobbles were able to inhibit climbing perch from taking a risky decision. These results show that, though the boldness is consistent in
climbing perch, this fish makes decisions flexibly in accordance with the demand of the situation.

In climbing perch, many of the decisions are influenced by visual cues rather than olfactory cues. The presence of olfactory cues like odour of conspecifics, skin extract of conspecifics (probable source of alarm pheromone), and the mucous secretion of predator were ineffective to impart any influence in different decision making situations analysed. However, an eyespot and heterospecific having a shape similar to that of conspecific (visual cues), were able to affect the decision making ability in this fish. Therefore it could be assumed that this fish is highly depended upon visual cues for gathering information. Hence, climbing perch provides an excellent model system for studying the cognitive abilities of fishes.