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NOTA BREVE

MATING BEHAVIOUR IN *Chasmagnathus granulata*, DANA, 1851 (BRACHYURA, GRAPSIDAE). COMPARISON WITH OTHER GRAPSID CRABS.

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In Brachyuran crabs, two general types of courtship and mating, called of the "soft females" and "hard females", were described (Hartnoll, 1969). In the case of the "soft females" (Cancridae, Portunidae, Geryonidae, Calappidae, Menippidae and Paratelphusidae), mating is produced immediately after the female molt (postmolt). These aquatic species present a period of premating during which the male embraces the female (Berrill & Arsenault, 1982; Orensanz *et al*., 1995; among others). In terrestrial or semiterrestrial crabs, the courtship is brief and the premating or postmating embrace does not exist, being this the typical courtship of the "hard females". Females mate during the period of intermolt; this mating pattern, which represents an adaptation to the terrestrial or semiterrestrial environment, is considered more evolved than the one of the aquatic Brachyura (Hartnoll, 1969). The families which present the courtship of the "hard females" are: Grapsidae, Ocypodidae, Xanthidae (except *Menippe mercenaria*) and Majidae (although in this family some species present intermediate strategies). In the case of intertidal species, mating takes place inside or outside the caves and the male can be outside the cave "protecting" the female (Hartnoll, 1969).

In the Grapsidae, a dance began by the male and in which the female cooperates, was described by the studies of Hyatt (1948) for *Pachygrapsus crassipes* and Hartnoll (1969) for *Eriocheir sinensis*. In *P. crassipes,* there are at least two phases associated to mating, where the first one is definitely of the "aggresive" type from the male to the female. The end of mating can also be an aggresive event (Bovbjerg, 1960). A waving movement of the chelae, similar to the one of the Ocypodidae, was recorded by Hartnoll (1969), for *Sesarma eumolpe* and *Grapsus grapsus*, while in *Cyclograpsus punctatus, Helice crassa*, *Pachygrapsus marmoratus*, *Hemigrapsus nudus* and *Hemigrapsus oregonensis* apparently there would be no courtship previous to mating (Hazlett, 1975).

In *Chasmagnathus granulata* we observed 11 mating events in aquaria and in the field. In all cases, males presented larger sizes than females in a percentage varying from 0.3 to 17.47 %, although males attain histological, morphometrical and functional maturity at smaller sizes than females (López, 1997; López *et al*., 1997). The displacement of the reproductive function to small males (although functionally mature) was described for the family Grapsidae, as well as for other species of Brachyura (Broekhuysen, 1941; Hyatt, 1948; Donaldson & Adams, 1989; Spivak, 1995; among others).

The total mating time was 10 to 100 minutes, a value similar to others found in the Grapsidae (Hartnoll, 1969). During the embrace, which can occur inside as well as outside the cave and with the crabs partially to totally submerged, the male maintains the female attached with its chelipeds by the base of its eye stalks; in some cases it also partially or totally attaches the female pereiopods with its own pereiopods.

The specimens were always observed mating in a position sternum by sternum, with the female over the male according to the descriptions of Hartnoll (1969) for *G. grapsus, H. nudus, H. oregonensis, Sesarma ricordi* and *P. crassipes*. Females were found in intermolt stage as most of the studied Grapsidae (Hartnoll, 1969; Tsuchida & Watanabe, 1997). Both members stayed practically without visible movements during the embrace once they reached the position pleon versus pleon; the separation of the specimens after mating was done in a sudden way, and no post-mating interaction was recorded. The presence of ovigerous females was only recorded twice, 21 and 24 days after the observed mating; similar values were recorded in *P. crassipes* by Hyatt (1948).

In relation to the so called mating associations (Christy, 1987), the observations carried out in *C. granulata* seem to indicate that males do not compete for the females nor for the resources; they only "intercept" the females and mate with them. There is no postmating care and the females do not show, apparently, any degree of receptivity. This model has been described for *H. crassa, A. pisonii, Goniopsis cruenata, H. oregonensis, H. nudus, G. grapsus, Sesarma cinereum* and *P. crassipes* within the Grapsidae (Christy, 1987). Although mating cases observed in *C. granulata* were not important in number, they would seem to indicate some degree of synchronization of mating with the moon phases and, since the egg spawnings and larval hatchings are linked to this factor (López, 1997), the possibility of the synchronism in matings is established for *C. granulata* at least as a reasonable hypothesis.

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