

Strategy for the Sustainable Management of Edible Semi-terrestrial Crab Species *Cardisoma guanhumi* (Land Crab) and *Ucides cordatus* (Ghost Crab) by the National Park of Guadeloupe

Estrategia para el Manejo Sostenible de Especies de Cangrejos Semi-terrestres Comestibles *Cardisoma guanhumi* (Cangrejo Blanco) y *Ucides cordatus* (Cangrejo de Barba) por el Parque Nacional de Guadeloupe

Stratégie pour une Gestion Durable des Espèces de Crabes Semi-terrestres Comestibles *Cardisoma guanhumi* (Crabe Blanc) et *Ucides cordatus* (Crabe à Barbe) par le Parc National de la Guadeloupe

SONIA BOURGEOIS-LEBE¹ and SIMONE MEGE²
¹Université des Antilles 97159 Pointe-à-Pitre, Guadeloupe.
kbourgeois@wanadoo.fr
²National Park of Guadeloupe 43,
rue Jean Jaurès 97122 Baie-Mahault, Guadeloupe.
simone.mege@guadeloupe-parcnational.fr

EXTENDED ABSTRACT

The National Park of Guadeloupe Island (Lesser Antilles) was created in 1989. From June 2009, the park is composed of multipolar cores (21,000 hectares), a partnership zone (90,000 ha) and a sustainable development marine zone (130,000 ha). The National Park has a territory charter defining the objectives for all these areas. Sixteen municipalities have subscribed to this project. The inhabitants of some of these municipalities have denounced the overexploitation and the non-selective methods of capture for *Cardisoma guanhumi* and *Ucides cordatus*. They were once consumed mainly during Easter and whit periods. They are currently fished all year round and their populations are threatened.

In this context, the National Park proposes a management model to protect these crabs.

The study site is located in the Caribbean coast of Guadeloupe Island in the town of Abymes, Morne-à-l'Eau, Sainte-Rose and Vieux Habitants (Figure 1)..



Figure 1. The study area.

The habitat for *Cardisoma gunahumi* are back mangrove and wet meadows, and *Ucides cordatus* prefers muddy mangrove soil. Both species are adults at about 4 years old. The carapace size is then 4.5 cm. Their breeding season extends mainly from May to September (Figure 2 A and B).

The decline of the population is due to:

- i) Habitat destruction comes from wetland nibbling, mangrove backfilling and coastal erosion,
- ii) Overfishing,
- iii) Capture during the breeding season. And
- iv) Non-selective capture techniques (burrow dug up, smothered animal from insecticide in the waders, net placed at the entrance of the burrows).

The most used technique is the crab box.



Photo: Simone Mège



Figure 2.
A. *Cardisoma gunahumi*
(Photo : Arnaud Pilarski)



B. *Ucides cordatus*
(Photo : Roico Bros)

The recommendations for a sustainable management of the resource are proposed:

- i) Preserve the natural habitat by respecting groundwater circulation and their good qualities to allow crabs to breathe at the bottom of their burrows,
- ii) Set a minimum catch size and favor dates the crab boxes the opening of which only allows the capture of crabs with the minimum required size,
- iii) Inform about important moments of the breeding season,
- iv) Preserve in the case of white crab individuals whose colors characterize juvenile and transient stages,
- v) Sensitize the population on non-selective capture techniques, and
- vi) Get closer to the organizers of the "Crab Festival" in the town of Morne à l'Eau, to accompany this event.

The set-up actions are as follows:

- i) Monitoring protocol to estimate the density and the dynamics of crab populations (Figure 3). The study is carried out on 10 quadrats (6 m x 6 m) set up in different habitats. Burrow densities are determined from these quadrats. We distinguish:
 - Active open burrows (detectable by the presence of feces at their entrance),
 - Inactive open burrows (absence of feces and traces of activity), and
 - Clogged burrows.



Figure 3. Monitoring protocol. (Photos: Simone Mège and Modeste Salignat)

- ii) Awareness raising of the population (general public and schools), and
- iii) Realization of a comic strip and an exhibition.

A regulation has been in place since August 2019 by the Department of the Sea of Guadeloupe in collaboration with the National Park of Guadeloupe:

- i) The capture, conservation or purchase of crabs are prohibited from May 16th to September 30th. authorized sampling: 20 crabs per fisherman (Figure 4),
- ii) Size to respect of 60 mm and catch technique allowed: crab box with an opening allowing the passage of crabs smaller than 60 mm for *Cardisoma guanhumi* (Figure 5), and
- iii) Hand-picking only for *Ucides cordatus*.

This management model ensures that cultural traditions are respected. That also guarantees the economic viability and the protection of periods when the number of females carrying eggs is the most important.

BIBLIOGRAPHICAL REFERENCES

For *Ucides cordatus* (Linnaeus, 1763)

- Alves, R.R.N., K. Nishida, and M.I.N. Hernandez. 2005. Environmental perception of gatherers of the crab caranguejo – uçã (*Ucides cordatus* Decapoda Brachyura) affecting their collection attitudes. *Journal of Ethnobiology* 2005(1):10.
- Castiglioni, D.S., D. Da Silva - Castiglioni, D. Da De Oliveira, and P.J. Albuquerque. 2013. Biologia reprodutiva de *Ucides cordatus* (L.) (Crustacea, Brachyura, Ucididae) em duas áreas de manguezal do litoral sul do Estado de Pernambuco, Brasil. *RGC* 13(4):433.

Castilho – Westphal, G.G., A. Ostrensky, M.R. Pie, and W.A. Boeger, 2013 – Morphology of the female reproductive system and reproductive cycle of the mangrove land crab *Ucides cordatus* (L.) in the Baía de Antonina, Parana, Brazil. *Acta Zoologica* 94(1):86 - 93.

Castilho, G.G., A. Ostrensky, M.R. Pie, and W.A. Boeger. 2008 – Morphology and histology of the male reproductive system of the mangrove land crab *Ucides cordatus* (L.) (Crustacea, Brachyura, Ocypodidae). *Act. Zool. (Stockholm)*, 89 : 157-161

Dalabona, G., J. De Loyola, and E. Silva. 2005 – Reproductive period of *Ucides cordatus* (Linnaeus, 1763) (Brachyura, Ocypodidae) in Laranjeiras Bay, southern Brazil. *Acta Biologica Par.* 34(1, 2, 3, 4):115 - 126.

De Oliveira, P.J.A., P.A. Coelho, and D.D.S. Castiglioni, 2013 – Population biology of *Ucides cordatus* (Linnaeus, 1763) (Crustacea, Brachyura, Ucididae) from two tropical mangroves sites in northeast coast of Brazil. *Panamjas* 8(2) 89 - 103.

Do Nascimento, D.M., J. Da Silva Mouraom and R.R.N. Alves. 2011. A substituição das técnicas tradicionais de captura do caranguejo-uçã (*Ucides cordatus*) pela técnica “redinha” no estuário do rio Manguape, Paraíba. *Sitientibus série Ciências Biológicas* 11(2):113 - 119.

Goes, P., J.O. Branco, M.A.A. Pinheiro, E. Barbieri, D. Costa, and L.L. Fernandes. 2010. Bioecology of the uçã-crab *Ucides cordatus* (Linnaeus, 1763) in Vitoria Bay, Espírito Santo State, Brazil. *Brazil Journal of Oceanography* 58(2):153 - 163.

Linhares, J.C. and J.R.F. Silva. 2012. Reproductive behavior of the mangrove crab *Ucides cordatus* (L.) (Crustacea, Brachyura, Ucididae). *Brazilian Archives of Biology and Technology* 55(6):903 - 910.

Miranda Leao Leite, M.D., C.F. Rezende, and J.R.F. Silva. 2013. Population biology of *Ucides cordatus* (Decapoda : Ucididae) in an estuary from semiarid Northeastern Brazil. *Revista Biologica Tropical* 61(4):11.

Pinheiro M.A.A., M.A. Baveloni, and O. Da Silva Leme Terceiro. 2003. Fecundity of the mangrove crab *Ucides cordatus* (Linnaeus, 1763) (Crustacea, Brachyura, Ocypodidae). *Invertebrate Reproduction and Development* 43(1):19 - 26.

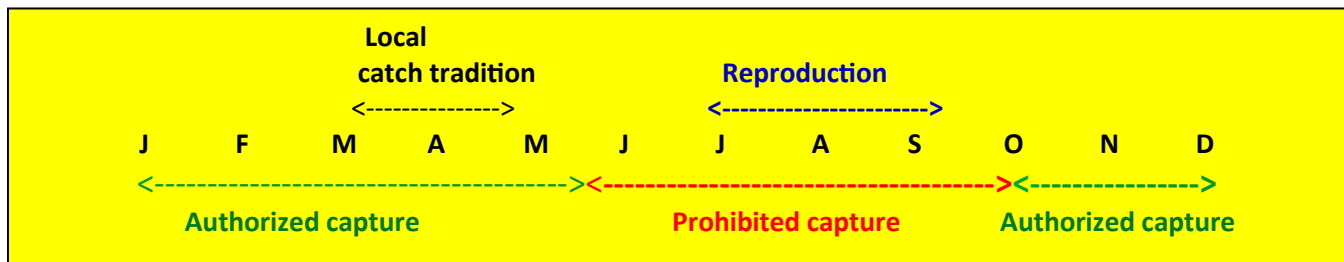


Figure 4. Calendar of regulations for *Cardisoma guanhumi*: land crab and *Ucides cordatus*: ghost crab.



Figure 5. Crab box with an opening (Photos: Simone Mège)

Sant'anna, B.S., R.P. Borges, G.Y. Hattori, and M.A.A. Pinheiro. 2014. Reproduction and management of the mangrove crab *Ucides cordatus* (Brachyura, Ucididae) at Iguape, Sao Paulo, Brazil. *Anais Da Academia Brasileira De Ciencias* 86(3):63 - 73.

For *Cardisoma guanhum* (Latreille 1828)

- Benito-Espinal, E. and A. Guyard. 1981. Biologie du crabe de terre, *Cardisoma guanhum* Latreille (Gecarcinidae) en Guadeloupe. Journées aquacoles de la Caraïbe, ADAM 14 - 17. 14 pp.
- Bourgeois – Lebel, S. and G. Ciavatti. 1990. Les Crustacés, Pages 113 - 139 in: *La Grande Encyclopédie de la Caraïbe* 5. 207 pp.
- Burggren, W.W. and R.B. McMahon. 1988. *Biology of the Land Crabs*. Cambridge University Press, New York, New York USA. 479 pp.
- Costlow, J.D. and C.G. Bookhout. 1968. The complete larval development of *Cardisoma guanhum* Latreille in the laboratory (Brachyura, Gecarcinidae). *Crustaceana*, 2:259 - 270.
- Dubois, S. 1997. *Quelques éléments de l'écologie des populations de crabe de terre Cardisoma guanhum* en Martinique. DESS Gestions des ressources renouvelables. Mémoire de DESS, Université Scientifique, Lille, France. 64 pp.
- Etile, M. 1998. *Etude Ethnobiologique sur les Crabes Consommés à la Martinique*. 35 pp.
- Gifford, C.A. 1963. Some observations on the general biology of the land crab *Cardisoma guanhum* (Latreille) in South Florida. *Biology* 97:207 - 223.
- Jean, R. 1995. *Contribution à la connaissance des crabes de la Réserve Naturelle de la Caravelle. Cas particulier de la répartition du crabe de terre " Cardisoma guanhum " en fonction des sentiers d'interprétation*. Rapport de stage de maîtrise, University Paris, Val de Marne, France. 20 pp.
- Shinozaki-Mendes, R.A., J.R.F. Silva, J. Santander-Neto, and F.H.V. Hazin. 2013. Reproductive biology of the land crab *Cardisoma guanhum* (Decapoda, Gecarcinidae) in north – eastern Brazil. *Journal of Marine Biological Association of the U. K.* 93(3):761 - 768.
- Silva, C. C., R. Schwamborn, and J.E. Lins Oliveira. 2014. Population biology and color patterns of the blue land crab, *Cardisoma guanhum* (Latreille 1828) (Crustacea : Gecarcinidae) in the northeastern Brazil. *Brazilian Journal of Biology* 74(4):949 - 958.
- Taissoun, E. 1974. El cangrejo de tierra *Cardisoma guanhum* (Latreille) en Venezuela : Distribucion, ecologia, biologia y evaluacion poblacional. *Bolletín del Cent. de Investigacion Biologo* (Univesidad del Zulia) 10:1 - 50.