

***Cardisoma armatum* (a crab, no common name)**

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, November 2018

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Photo: M. Stanikowski. Public domain. Available:
https://commons.wikimedia.org/wiki/File:Krab_t%C4%99czowy.JPG. (November 2018).

1 Native Range and Status in the United States

Native Range

From Palomares and Pauly (2018):

“Atlantic Ocean: [along the African coast] from Cape Verde and Senegal to Angola.”

Status in the United States

This species has not been reported as introduced or established in the United States. This species is in trade, at least intermittently, in the United States.

From Arizona Aquatic Gardens (2018):

“Crab – Patriot Crab”

“\$22.99”

“Out of stock”

“Tags: *Cardisoma armatum* [...]”

Means of Introductions in the United States

This species has not been reported as introduced or established in the United States.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From WoRMS (2018):

“Biota > Animalia (Kingdom) > Arthropoda (Phylum) > Crustacea (Subphylum) > Multicrustacea (Superclass) > Malacostraca (Class) > Eumalacostraca (Subclass) > Eucarida (Superorder) > Decapoda (Order) > Pleocyemata (Suborder) > Brachyura (Infraorder) > Eubrachyura (Section) > Thoracotremata (Subsection) > Grapsoidea (Superfamily) > Gecarcinidae (Family) > *Cardisoma* (Genus) > *Cardisoma armatum* (Species)”

“Status accepted
Rank Species”

Size, Weight, and Age Range

From Fischer et al. (1981):

“Maximum carapace length 9.5 cm and carapace width 12 cm (adult males).”

Environment

From Palomares and Pauly (2018):

“Demersal; brackish.”

From Fischer et al. (1981):

“The species is terrestrial and lives in burrows in marshy ground near lagoons, but also on higher ground as long as the burrows can reach the saline ground water.”

Climate/Range

From Palomares and Pauly (2018):

“Tropical”

Distribution Outside the United States

Native

From Palomares and Pauly (2018):

“Atlantic Ocean: [along the African coast] from Cape Verde and Senegal to Angola.”

Introduced

This species has not been reported as introduced or established outside of its native range.

Means of Introduction Outside the United States

This species has not been reported as introduced or established outside of its native range.

Short Description

From Fischer et al. (1981):

“Carapace somewhat heart-shaped, broadest in the anterior part, narrowing posteriorly; surface slightly convex and smooth, apart from some faint grooves; lateral margins not sharply defined, without teeth, except for outer orbital angle. Front slightly broader than the orbits, trapezoid, evenly narrowing anteriorly, without teeth; fronto-orbital width (space between the outer orbital angles) $\frac{3}{4}$ to $\frac{2}{3}$ of the greatest carapace width. Chelipeds distinctly unequal in large specimens, fingers meeting at the tips only; walking legs with short bundles of dark hairs; dactyls with 4 ridges, each bearing a row of spines. Third maxilliped with pals and exopod visible.”

“Colour: large specimens are dirty orange-brown or yellowish with blue and red hues on the dorsal surface of body and chelipeds. In some specimens the carapace and upper part of the chelipeds may be bluish, the lower surface of the chelipeds and the walking legs more reddish.”

From Bright and Hogue (1972):

“Young, newly molted individuals with violaceous carapace; tips of chelae and walking legs bright red; with age and approach to molt carapace turns dirty yellow with occasionally slight reddish spots dorsally.”

Biology

From Bright and Hogue (1972):

“Habitat: Moist sandy areas above the mean high tide level; mangroves, mouth of rivers, under houses, in cultivated areas adjacent to permanent sources of brackish or sea water; and inland areas of larger islands.”

“Habits: Youngest juveniles are in small depressions or newly dug shallow burrows directly adjacent to water; older juveniles found in smaller compartments within the burrows of adults. Adults construct deep burrows, and often these are part of a large colony where the burrows intersect. Both juveniles and adults are nocturnal scavengers, often moving considerable distance from their burrows to feed on palmnuts, coconuts, dead fish and scraps of vegetation.”

From Cuesta and Anger (2005):

“Although most terrestrial crabs of the family Gecarcinidae, including *Cardisoma armatum*, tolerate brackish water and even freshwater, their larvae require, as far as known, at least 15‰ salinity for successful development to metamorphosis (cf. Costlow and Bookhout, 1968). The osmotic sensitivity of the larval stages forces ovigerous females to migrate to the sea to release the larvae in waters with higher salinities (Adiyodi, 1988). The results of the salinity experiments in our present study also show that the larvae of *C. armatum* tolerate reduced salinities to about 15‰, but not oligohaline or freshwater conditions of habitats where adults of this species live and produce eggs (cf. Ameyaw-Akumfi, 1987, 1989; Oyekan, 1995). Interestingly, the larvae appear to prefer moderately brackish conditions of about 25‰ rather than full-strength seawater [...], which suggests adaptation to some larval retention within the lower estuarine parts of coastal mangrove swamps adjacent to the habitats of the adults.”

Human Uses

From Palomares and Pauly (2018):

“Fisheries: commercial”

From Fischer et al. (1981):

“Caught for private consumption or sold in local markets. Eaten boiled or fried, and widely used as food throughout their range, both by the native population and, to a smaller degree, by Europeans.”

This species is in trade in the United States.

From Arizona Aquatic Gardens (2018):

“Crab – Patriot Crab”

“\$22.99”

“Out of stock”

“Tags: *Cardisoma armatum* [...]”

Diseases

No information available. No OIE-reportable diseases have been documented for this species.

Threat to Humans

From Palomares and Pauly (2018):

“Harmless”

3 Impacts of Introductions

This species has not been reported as introduced or established outside of its native range.

4 Global Distribution

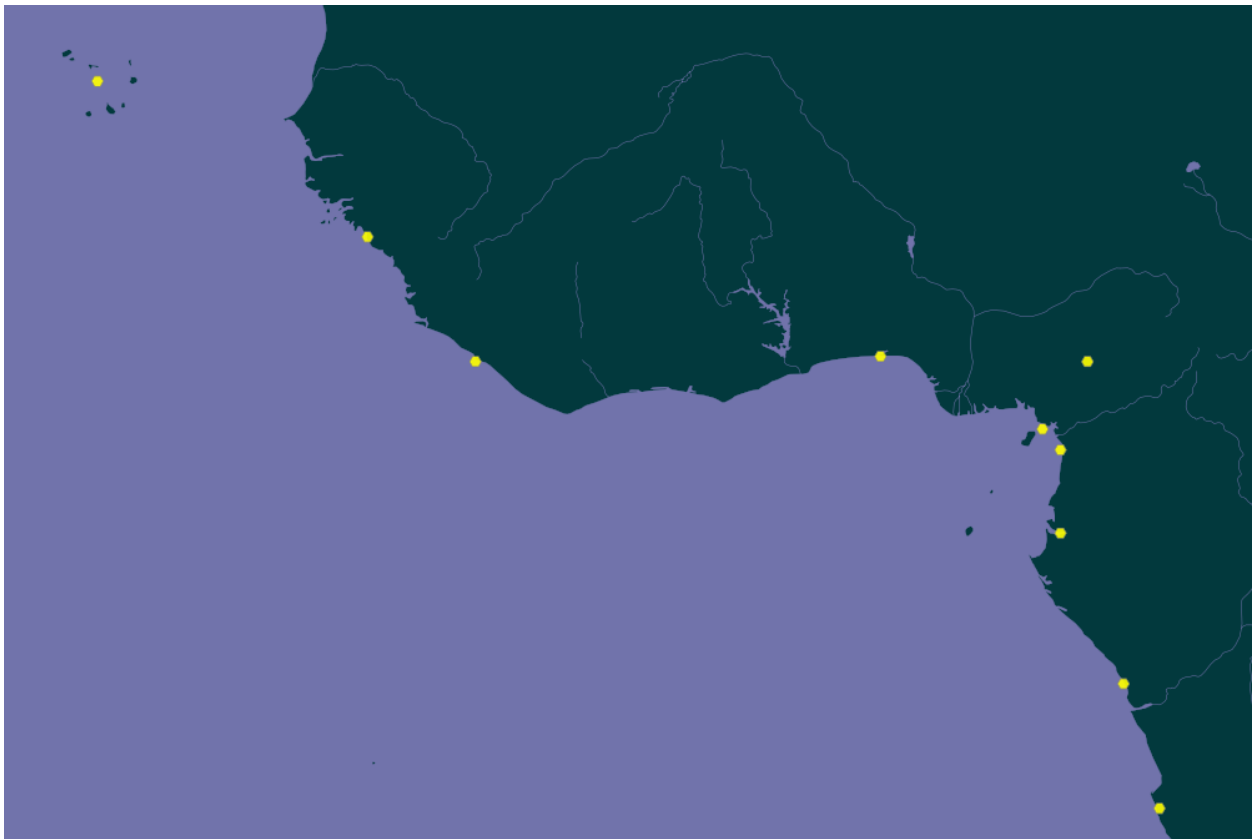


Figure 1. Known global distribution of *Cardisoma armatum*, reported from the western coast of Africa. Map from GBIF Secretariat (2017).

5 Distribution Within the United States

This species has not been reported as introduced or established in the United States.

6 Climate Matching

Summary of Climate Matching Analysis

The Climate 6 score (Sanders et al. 2014; 16 climate variables; Euclidean distance) for the contiguous United States was 0.0, which is a low climate match. A Climate 6 score of 0.005 or below indicates a low climate match. The climate match was low in every state in the contiguous United States. There was a small area of medium climate match in southern Florida, and otherwise climate matches were low throughout the country.

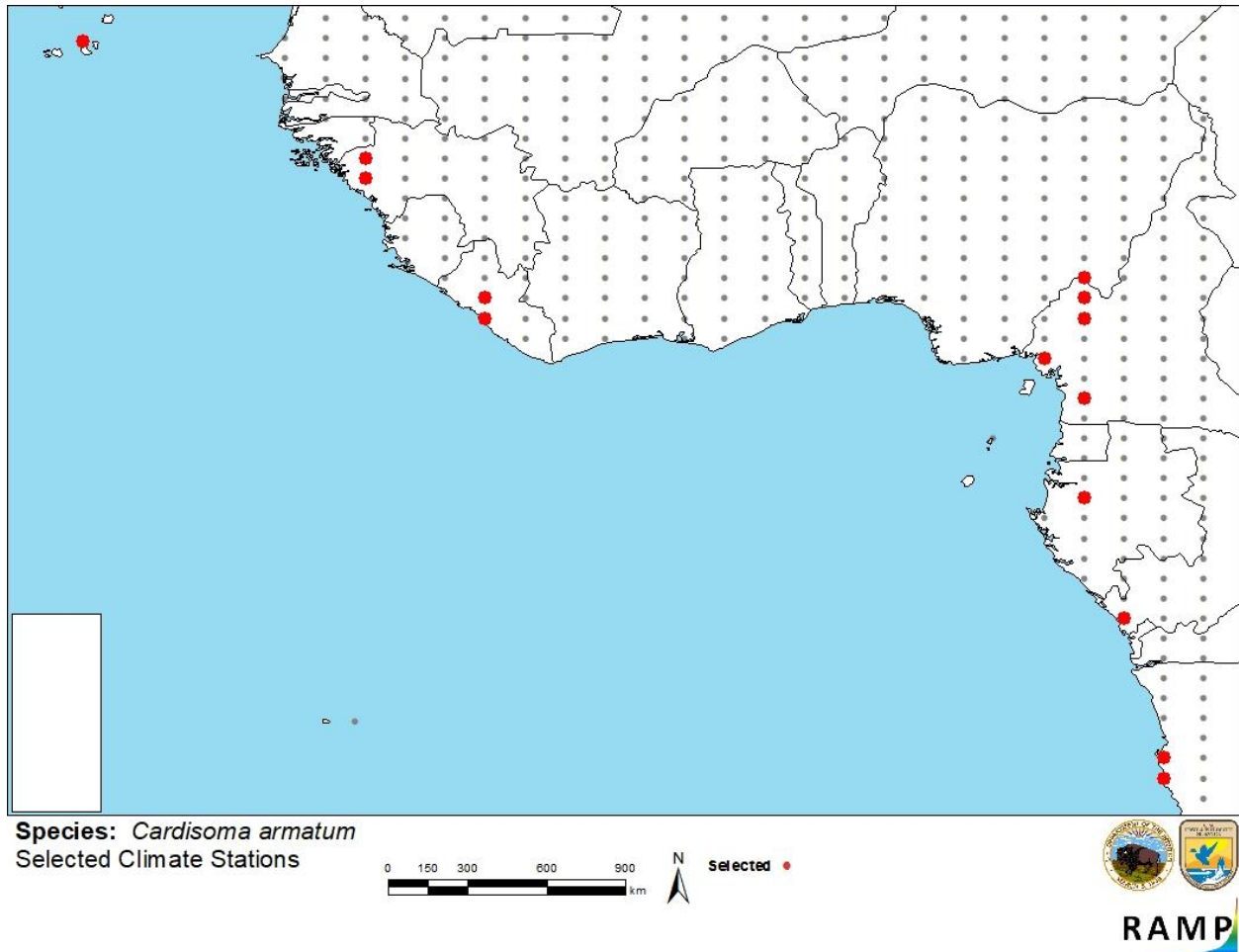


Figure 2. RAMP (Sanders et al. 2014) source map showing weather stations in western Africa selected as source locations (red; Cape Verde, Guinea, Liberia, Cameroon, Gabon, Republic of the Congo, Angola) and non-source locations (gray) for *Cardisoma armatum* climate matching. Source locations from GBIF Secretariat (2017).

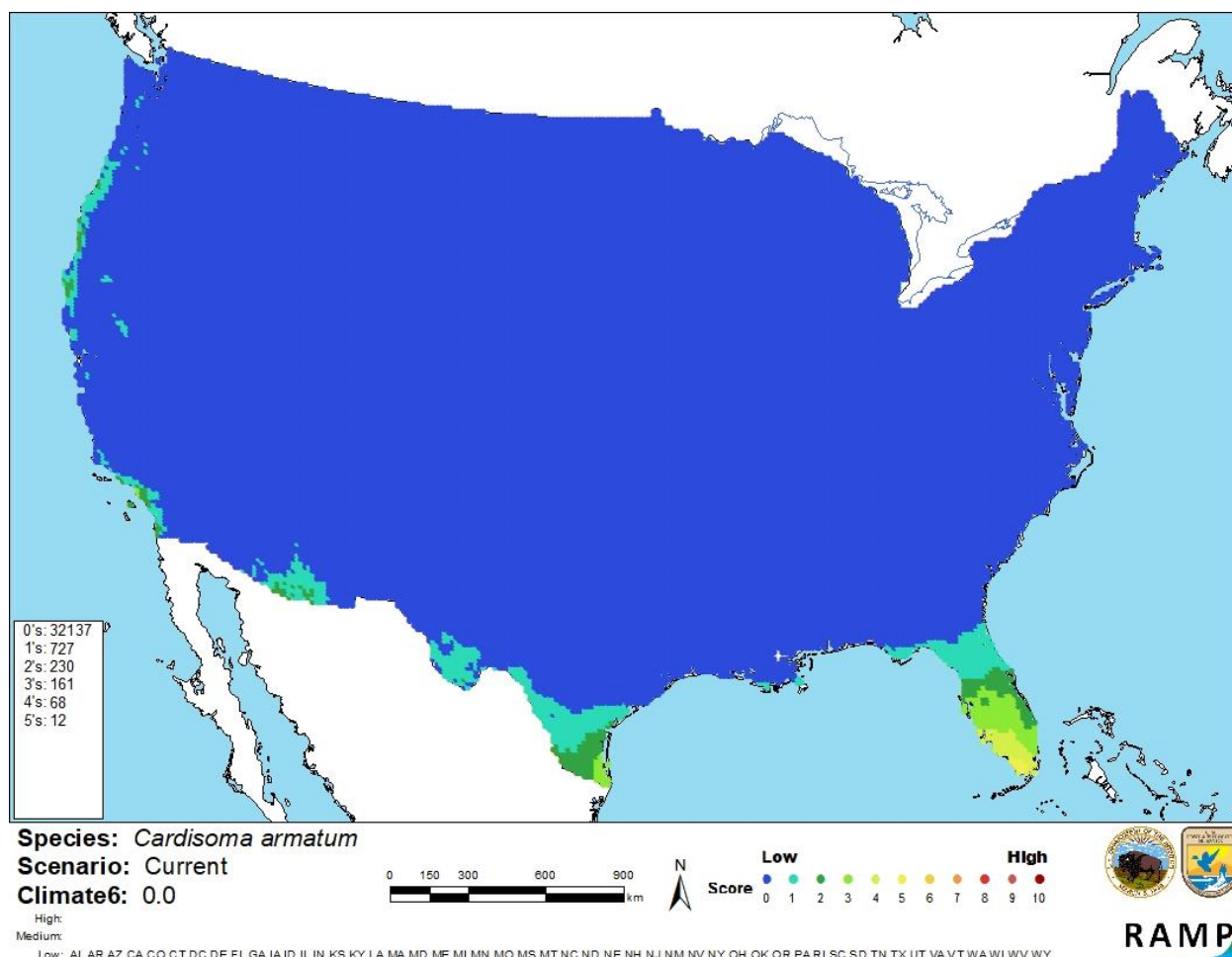


Figure 3. Map of RAMP (Sanders et al. 2014) climate matches for *Cardisoma armatum* in the contiguous United States based on source locations reported by GBIF Secretariat (2017). 0=Lowest match, 10=Highest match.

The “High”, “Medium”, and “Low” climate match categories are based on the following table:

Climate 6: Proportion of (Sum of Climate Scores 6-10) / (Sum of total Climate Scores)	Climate Match Category
$0.000 \leq X \leq 0.005$	Low
$0.005 < X < 0.103$	Medium
≥ 0.103	High

7 Certainty of Assessment

There is some information available about the biology and distribution of *Cardisoma armatum*, but a lack of information relevant to assessing the invasive potential of this species. *C. armatum* has never been reported as introduced outside of its native range, so there is no information available to assess the risk it may pose to the contiguous United States. *C. armatum* requires water of at least 15‰ salinity to reproduce successfully; although this concentration is less saline than ocean water, it is unclear how widely *C. armatum* would be able to establish in the

predominantly oligohaline waters of the interior United States. Certainty of this assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Cardisoma armatum is a terrestrial crab species native to Cape Verde and the West Coast of Africa from Senegal to Angola. In its native range, it is consumed and sold as a food source, and it is in the pet trade in the United States. *C. armatum* has never been reported as introduced or established outside of its native range, so the history of invasiveness is uncertain. It has a low climate match with the contiguous United States overall, with a medium match only in southern Florida. *C. armatum* requires water of at least 15‰ salinity to reproduce successfully; although this concentration is less saline than ocean water, it is unlikely that *C. armatum* would be able to establish widely in the predominantly oligohaline waters of the interior United States. There is relatively little information available from which to assess the risk *C. armatum* poses to the contiguous United States, so the certainty of this assessment is low. The overall risk assessment category is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): Uncertain**
- **Climate Match (Sec. 6): Low**
- **Certainty of Assessment (Sec. 7): Low**
- **Overall Risk Assessment Category: Uncertain**

9 References

Note: The following references were accessed for this ERSS. References cited within quoted text but not accessed are included below in Section 10.

- Arizona Aquatic Gardens. 2018. Crab—Patriot Crab. Available: <https://www.azgardens.com/product/patriot-crab/>. (November 2018).
- Bright, D. B., and C. L. Hogue. 1972. A synopsis of the burrowing land crabs of the world and list of their arthropod symbionts and burrow associates. Natural History Museum of Los Angeles County Contributions in Science 220:1-58.
- Cuesta, J. A., and K. Anger. 2005. Larval morphology and salinity tolerance of a land crab from West Africa, *Cardisoma armatum* (Brachyura: Grapsoidea: Gecarcinidae). Journal of Crustacean Biology 25(4):640-654.
- Fischer, W., G. Bianchi and W. B. Scott, editors. 1981. FAO species identification sheets for fishery purposes. Eastern Central Atlantic fishing areas 34, 47 (in part), volume VI. Canada Funds-in-Trust, Department of Fisheries and Oceans Canada, Ottawa, by arrangement with the Food and Agriculture Organization of the United Nations, Rome.

GBIF Secretariat. 2017. GBIF backbone taxonomy: *Cardisoma armatum*, Herklots, 1851. Global Biodiversity Information Facility, Copenhagen. Available: <https://www.gbif.org/species/4382786>. (November 2018).

Palomares, M. L. D., and D. Pauly, editors. 2018. *Cardisoma armatum* (Herklots, 1851). SeaLifeBase. Available: <https://www.sealifebase.ca/summary/Cardisoma-armatum.html>. (November 2018).

Sanders, S., C. Castiglione, and M. H. Hoff. 2014. Risk Assessment Mapping Program: RAMP. U.S. Fish and Wildlife Service.

WoRMS. 2018. *Cardisoma armatum*. In World Register of Marine Species. Available: <http://www.marinespecies.org/aphia.php?p=taxdetails&id=241193>. (November 2018).

10 References Quoted But Not Accessed

Note: The following references are cited within quoted text within this ERSS, but were not accessed for its preparation. They are included here to provide the reader with more information.

Adiyodi, R. T. 1988. Reproduction and development. Pages 139-185 in W. W. Burggren, and B. R. McMahon, editors. Biology of the land crabs. Cambridge University Press, New York.

Adiyodi, R. T. 1989. Preliminary observations on seasonal movements of *Cardisoma armatum* Herklots, 1851. *Crustaceana* 57:223-224.

Ameyaw-Akumfi, C. 1987. Mating in the lagoon crab *Cardisoma armatum* Herklots. *Journal of Crustacean Biology* 7:433-436.

Costlow, J. D., Jr., and C. G. Bookhout. 1968. The complete larval development of the land-crab, *Cardisoma guanhumi* Latreille in the laboratory (Brachyura, Gecarcinidae). *Crustaceana Supplement* 2:259-270.

Oyenekan, J. A. 1995. Growth patterns in three brachyuran crabs in Lagos, Nigeria. *Archiv für Hydrobiologie* 134:533-546.