

Gaetice depressus (a crab, no common name)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, August 2020
Revised, December 2020
Web Version, 3/24/2021

Organism Type: Crustacean
Overall Risk Assessment Category: Uncertain



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<https://ffish.asia/?page=file&pid=74251>. (December 2020).

1 Native Range and Status in the United States

Native Range

From Wahyudi et al. (2015):

“*Gaetice depressus* (De Haan 1833), known as one of the more common intertidal crabs in the North Western Pacific area, especially in East Asia (Ng et al. 2008), [...]”

From Davie and Ng (2007):

“Distribution. – Japan, [South] Korea, China [including Hong Kong] and Taiwan.”

From Crabs of Russia (2020):

“From Peter the Great Gulf (Sea of Japan) to Hong Kong and from Hakodate (Hokkaido Island) to Formosa (= Taiwan). Coastal form. [Vinogradov 1950]. Japan. Also ranges to Korea and China. [Sakai, 1976].”

Status in the United States

Gaetice depressus has not been reported as introduced or established in the wild in the United States.

According to Arizona Aquatic Gardens (2020), *G. depressus* is listed for sale under the name Japanese Godzilla Crab, for \$14.66 per individual. However, it is currently listed as “Out of stock.”

Means of Introductions in the United States

Gaetice depressus has not been reported as introduced or established in the wild in the United States.

Remarks

Gaetice depressus can survive in brackish and marine waters.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From WoRMS (2020):

“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) > Varunidae (Family) > Gaeticinae (Subfamily) > *Gaetice* (Genus) > *Gaetice depressus* (Species)”

“Status[:] accepted”

Size, Weight, and Age Range

From Wahyudi et al. (2015):

“Maximum age is three years with mean life span of two years (Fukui 1988, 1990).”

“The maximum size of crabs was reported as CW 28.1 mm and CW 23.4 mm in male and female, respectively (Fukui 1988).”

Environment

From Davie and Ng (2007):

“Habitat. – Found under small rocks, on coral-sand substrate close to the river mouth.”

From Depledge 1989:

“intertidal”

From WoRMs (2020):

“marine, brackish”

Climate

From Depledge 1989:

“subtropical”

Distribution Outside the United States

Native

From Wahyudi et al. (2015):

“*Gaetice depressus* (De Haan 1833), known as one of the more common intertidal crabs in the North Western Pacific area, especially in East Asia (Ng et al. 2008), [...]”

From Davie and Ng (2007):

“Distribution. – Japan, [South] Korea, China [including Hong Kong] and Taiwan.”

From Crabs of Russia (2020):

“From Peter the Great Gulf (Sea of Japan) to Hong Kong and from Hakodate (Hokkaido Island) to Formosa (= Taiwan). Coastal form. [Vinogradov, 1950]. Japan. Also ranges to Korea and China. [Sakai, 1976].”

Introduced

Gaetice depressus has not been reported as introduced or established anywhere outside of its native range.

Means of Introduction Outside the United States

Gaetice depressus has not been reported as introduced or established anywhere outside of its native range.

Short Description

From Davie and Ng (2007):

“Diagnosis. – Carapace subquadrate, broadening anteriorly, dorsal surface flat, smooth; frontal margin strongly lobed. Anterolateral margin with 3 teeth including orbital tooth. Third maxilliped with oblique suture between merus/ischium. Medial sulcus on anterior sternal plates narrow. Infraorbital ridge with numerous small, round granules. Chelipeds symmetrical, occasionally unequal, larger in male, large gape between fingers of adult males, usually with one or two large teeth near base of moveable finger. Propodus of last ambulatory legs short, broad. Colour. – Highly variable, ranging from light cream to dark brown, with dark brown and/or black spots (unpublished data).”

“This species [*Gaetice depressus*] can be easily distinguished from *G. ungulatus* by the following: 1) the lateral lobes of the frontal margin are very distinct (not distinct in *G. ungulatus*); 2) the infraorbital ridge has numerous (usually more than 12) small, isomorphic granules (usually less than 8 larger granules in *G. ungulatus*); 3) the anterolateral angle of the merus of the third maxillipeds is very convex (less convex in *G. ungulatus*); 4) the propodus of the last ambulatory leg is broad and short (long and narrow in *G. ungulatus*); 5) the sixth abdominal segment is broad and stout (long and narrow in *G. ungulatus*), 6) the male telson is broadly triangular (more elongated in *G. ungulatus*).”

Biology

From Depledge (1989):

“This species was found to be an omnivorous scavenger capable of ingesting both animal and plant tissues which are passed to the mouth using the chelipeds. Furthermore, the mouthparts themselves are modified and bear elongated setae, notably on the third maxillae. The net-like structures which the setae give rise to can be repeatedly flailed through the seawater in unison enabling the crabs to feed on suspended material. Beating frequency decreased with crab size but rose with increasing suspension concentration. Experiments demonstrated that suspension feeding can contribute significantly to nutrient uptake and direct observations confirmed that the crabs use this method in situ. The crabs are also able to use the setose appendages to sweep deposited material from the underlying substrate towards the mouth, presumably for nutritive purposes.”

From Davie and Ng (2007):

“Found under small rocks, on coral-sand substrate close to the river mouth. They sometimes stack on top of each other in large numbers. Actively suspension feed while covered by high tide.”

From Wahyudi et al. (2015):

“Life cycle: The life cycle of *G. depressus* is similar to other crabs and develops from egg to mature adults as follows: Egg→Zoea→Megalopa→Juvenile→Mature. The period from egg to

maturity is about 1 year, and then it continues molting twice per year (March-April and October-November).”

“Temporal density pattern: The density of new recruiters usually increases rapidly from summer to autumn. Their density is occasionally marked low from December to March of the following year, and afterward it increases again until May. Their density decreases gradually after May but the decrease rate is more or less different from year to year and according to sampling sites. In each age group, males and females show a similar density change (Fukui 1988). However, this pattern is affected by the types of habitat. Takada (1999) reported that the boulder layer does have a significant effect on density because *G. depressus* does not depend on the boulder layer since they can burrow into the sediment below boulders.

Molting: The intermolt period of *G. depressus* ranges from 6 to 98 days for males (CW 4.7 to 28.3 mm) and from 4 to 117 days for females (CW 3.9 to 20.6 mm). Molting rarely occurs in January and February due to low temperature, but becomes frequent in October, November, March and April. All females molt in October or November shortly after the breeding season (Fukui 1988; Fukui 1990).

The breeding season: *G. depressus* belongs to the spring to autumn breeding group; their breeding period lasts about 8 months from March to October or November. The percentage of the ovigerous females shows similar seasonal changes among species, with two peaks from May to June and from September to October (Fukui 1988, 1990).

Age and size at maturity: Mean age at maturity in female of each species can be calculated from the period between the mean birth month of an age group and the month when about 50% of females become ovigerous; it is 11 months old (about 1-year- old) and size at maturity is CW 7.2 mm (Fukui 1988).”

“Individual females of *G. depressus* were estimated to lay eggs at an average of five to six times during the oviposition season from March to October (Fukui 1988, 1990).”

Human Uses

According to Arizona Aquatic Gardens (2020), *G. depressus* is listed for sale under the name Japanese Godzilla Crab, for \$14.66 per individual. However, it is currently listed as “Out of stock.”

Diseases

No OIE-reportable diseases (OIE 2020) were found to be associated with *G. depressus*.

From Corral et al. (2019):

“The effects of infestation by the bopyrid isopod *Megacepon goetici* on the varunid crab *Gaeticus depressus* were investigated. [...] Samples were collected in Wakayama Prefecture, Japan. From a total of 1694 crabs, 61 (3.6%) were parasitized by bopyrid isopods. No ovigerous females were parasitized, which may be evidence of parasitic castration of female host crabs, as has been described in other parasitized brachyuran crabs. Total weight was reduced in both males and

females, and infested crabs also exhibited subtle lateral and dorsal carapace swelling due to the presence of parasites under the carapace. We therefore conclude that the morphology and the reproductive capacity of *G. depressus* were significantly affected by the bopyrid isopod.”

Threat to Humans

No information on threat to humans was found.

3 Impacts of Introductions

Gaetice depressus has not been reported as introduced or established anywhere outside of its native range, therefore no impacts of introduction have been documented.

4 History of Invasiveness

The history of invasiveness is classified as No Known Nonnative Population. *Gaetice depressus* has not been reported as introduced or established anywhere outside of its native range, therefore no impacts of introduction have been documented. This species is found in the aquarium trade, however not at substantial volumes.

5 Global Distribution



Figure 1. Known global distribution of *Gaetice depressus*. Observations are reported from Japan, China, South Korea, Hong Kong, Taiwan, Russia and the Bahamas. Map from GBIF Secretariat (2020). Locations in the Bahamas, and inland China will not be used in the climate match as they represent museum specimens and not wild, established populations.

6 Distribution Within the United States

Gaetice depressus has not been reported in the wild in the United States.

7 Climate Matching

Summary of Climate Matching Analysis

The climate match for the contiguous United States is generally low in the western half of the country, and medium to high in the eastern half. High match is found in small patches along the eastern Great Lakes, along the Appalachian Mountains, and along the Atlantic Coast from Virginia to Florida. The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.110, high (scores 0.103 and greater are classified as high). The following States received high individual Climate 6 scores: Florida, Georgia, Indiana, Kentucky, Maryland, Missouri, North Carolina, New Jersey, New York, Ohio, Oklahoma, Pennsylvania, South Carolina, Tennessee, Virginia, Vermont, and West Virginia. The following States received medium individual Climate 6 scores: Alabama, Arkansas, Connecticut, Illinois, Kansas, Massachusetts, Michigan, New Hampshire, and Texas. All remaining States received low individual scores. The climate match does not account for salinity tolerance. Species establishment will require both a suitable climate and the availability of aquatic habitat with appropriate salinity (see Environment, above).

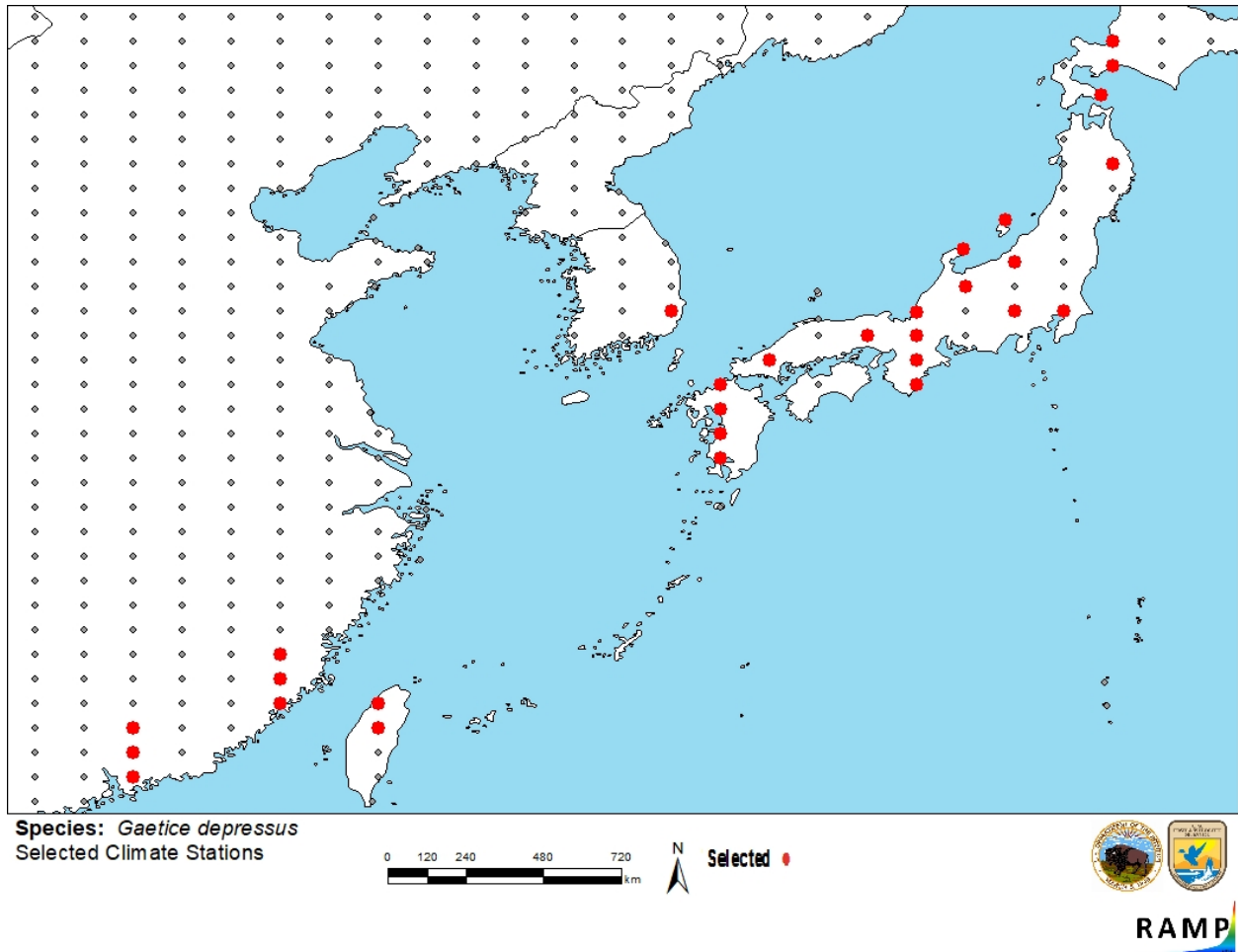


Figure 2. RAMP (Sanders et al. 2018) source map of East Asia showing selected source locations (red; Japan, China, Hong Kong, Taiwan, South Korea) and non-source locations (gray) for *Gaetice depressus*. Source locations from GBIF Secretariat (2020). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

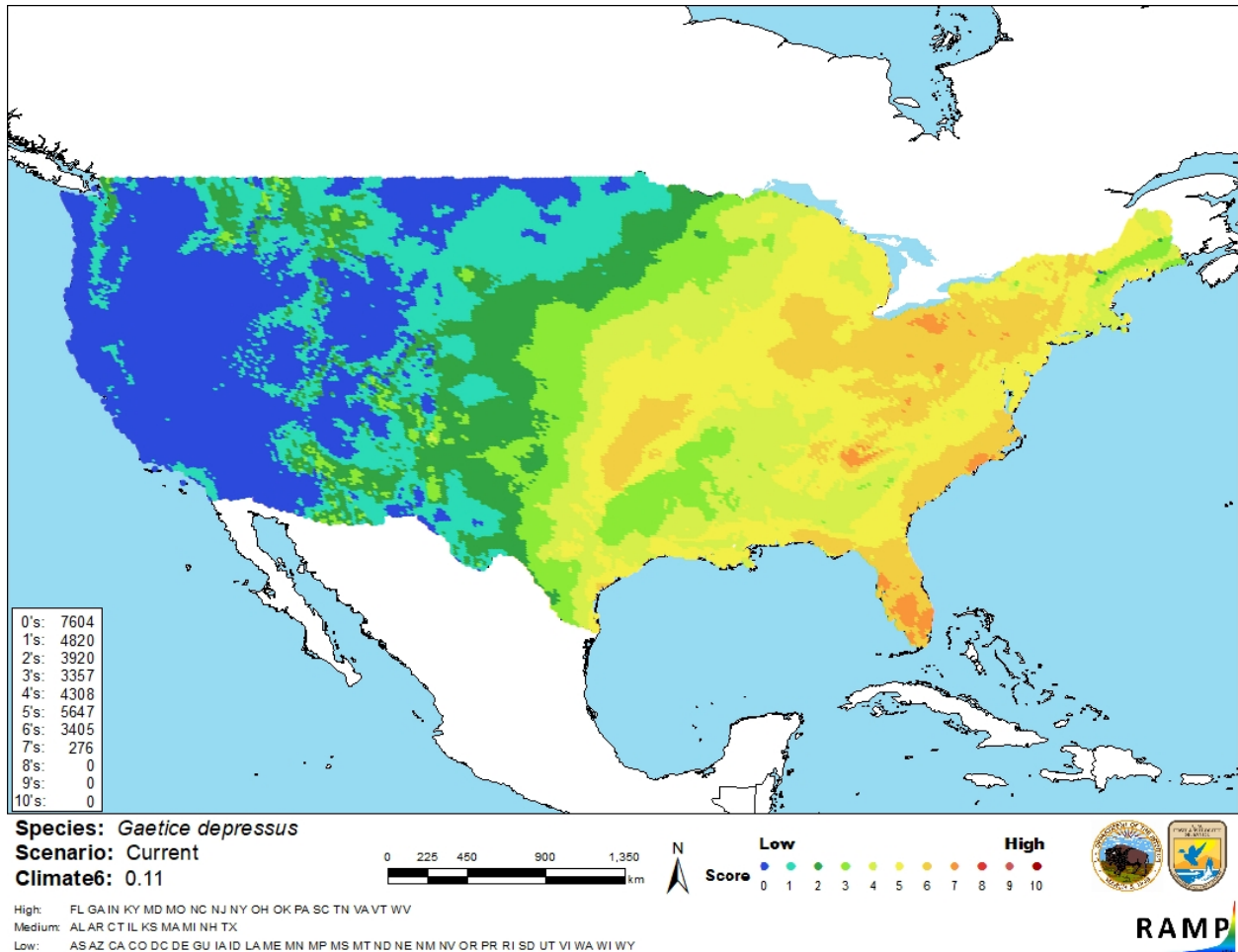


Figure 3. Map of RAMP (Sanders et al. 2018) climate matches for *Gaetice depressus* in the contiguous United States based on source locations reported by GBIF Secretariat (2020). Counts of climate match scores are tabulated on the left. 0/Blue = Lowest match, 10/Red = Highest match.

The High, Medium, and Low Climate match Categories are based on the following table:

Climate 6: (Count of target points with climate scores 6-10)/ (Count of all target points)	Overall Climate Match Category
$0.000 \leq X \leq 0.005$	Low
$0.005 < X < 0.103$	Medium
≥ 0.103	High

8 Certainty of Assessment

Some information is available on the biology and ecology of *Gaetice depressus*. Limited information is available on the entire distribution of this species. No introductions have been reported outside of the native range, therefore no information is available on the impacts of introduction. The climate match does not account for salinity tolerance. Species establishment

will require both a suitable climate and the availability of aquatic habitat with appropriate salinity. The certainty of assessment is Low.

9 Risk Assessment

Summary of Risk to the Contiguous United States

Gaetice depressus, is an intertidal crab native to East Asia including China, including Hong Kong, Japan, South Korea, and Taiwan. The history of invasiveness is No Known Nonnative Population. *Gaetice depressus* has not been reported as introduced or established anywhere outside of its native range, therefore no impacts of introduction have been documented. This species is found in the aquarium trade in the United States. The overall climate match for the contiguous United States is High. The majority of the eastern contiguous United States had a medium match with areas of high matches found in Southeast and the eastern Midwest. The climate match does not account for salinity tolerance. Species establishment will require both a suitable climate and the availability of aquatic habitat with appropriate salinity. The certainty of assessment is Low due to a lack of information and salinity requirements. The overall risk assessment category for *Gaetice depressus* is Uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 4): No Known Nonnative Population**
- **Overall Climate Match Category (Sec. 7): High**
- **Certainty of Assessment (Sec. 8): Low**
- **Remarks, Important additional information: None**
- **Overall Risk Assessment Category: Uncertain**

10 Literature Cited

Note: The following references were accessed for this ERSS. References cited within quoted text but not accessed are included below in Section 11.

Arizona Aquatic Gardens. 2020. Crab – Japanese Godzilla crab – *Gaetice depressus*. Available: <https://azgardens.com/product/crab-japanese-godzilla-crab-gaetice-depressus/> (December 2020).

Corral JM, Henmi Y, Shiozaki Y, Itani G. 2019. Parasitic effects of the bopyrid *Megacepon goetici* (Crustacea: Isopoda) on the varunid crab *Gaetice depressus*. *Diseases of Aquatic Organisms* 135:71–75.

Crabs of Russia. 2020. *Gaetice depressus* (De Haan, 1835). Available: http://www.crabs.ru/russia/fam_varunidae_gaetice_depressus.htm (December 2020).

Davie PJF, Ng NK. 2007. Two new subfamilies of Varunidae (Crustacea: Brachyura), with description of two new genera. *The Raffles Bulletin of Zoology* (Supplement 16):257–272.

Depledge MH. 1989. Observations on the feeding behaviour of *Gaetice depressus* (Grapsidae: Varuninae) with special reference to suspension feeding. *Marine Biology* 100(2):253–259.

GBIF Secretariat. 2020. GBIF backbone taxonomy: *Gaetice depressus* (De Haan, 1833). Copenhagen: Global Biodiversity Information Facility. Available: <https://www.gbif.org/species/5863353> (December 2020).

[OIE] World Organisation for Animal Health. 2020. OIE-listed diseases, infections and infestations in force in 2020. Available: <http://www.oie.int/animal-health-in-the-world/oie-listed-diseases-2020/> (December 2020).

Sanders S, Castiglione C, Hoff M. 2018. Risk Assessment Mapping Program: RAMP. Version 3.1. U.S. Fish and Wildlife Service.

Wahyudi AJ, Wada S, Aoki M, Hama T. 2015. *Gaetice depressus* (Crustacea, Varunidae): species profile and its role in organic carbon and nitrogen flow. *Ocean Science Journal* 50:389–401.

WoRMS. 2020. *Gaetice depressus* (De Haan, 1833 [in De Haan, 1833-1850]). World Register of Marine Species. Available: <http://www.marinespecies.org/aphia.php?p=taxdetails&id=444753> (August 2020).

11 Literature Cited in Quoted Material

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.

Fukui Y. 1988. Comparative studies on the life history of the Grapsid crabs (Crustacea, Brachyura) inhabiting intertidal cobble and boulder shores. *Pub Seto Mar Biol Lab* 33:121–162.

Fukui Y. 1990. Breeding and moulting of *Gaetice depressus* (De Haan) (Brachyura: Grapsidae) under laboratory conditions. *Res Crust* 19:83–90.

Ng PKL, Guinot D, Davie PJF. 2008. Systema brachyurorum I: an annotated checklist of extant brachyuran crabs of the world. *The Raffles Bulletin of Zoology (Supplement 17)*:1–286

Sakai. 1976. [Source material did not give full citation for this reference.]

Vinogradov. 1950. [Source material did not give full citation for this reference.]