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# Presence of Juvenile Lionfish in a Northern Gulf of Mexico Nursery Habitat

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# SHORT PAPERS AND NOTES

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PRESENCE OF JUVENILE LIONFISH IN A NORTHERN GULF OF MEXICO NURSERY HABITAT.—Indo-Pacific lionfish of the *Pterois volitans/miles* complex is clearly among the most successful invasive marine taxa, having colonized and thrived in the southeastern Atlantic, Caribbean and, more recently, the Gulf of Mexico. The first Gulf of Mexico record of *P. volitans* occurred in 2009 near the Mexican Yucatan Peninsula (Aguilera-Perera and Tuz-Salub, 2010), but this species has spread rapidly and now occurs throughout most of the Gulf of Mexico (Fogg et al. 2013; Dahl and Patterson 2014). Using National Marine Fisheries Service data from bottom trawls across the northern Gulf of Mexico (nGOM), Fogg et al. (2013) reported that no lionfish were captured between 1972 and 2009, few individuals were collected in 2010 and 2011, but there was a 16-fold increase in abundance by 2012. Furthermore, between fall 2010 and fall 2013, Dahl and Patterson (2014) found that lionfish densities increased exponentially at both natural and artificial offshore reef habitats, rising from zero in 2010 to 0.5 individuals·$(100\ m)^{-2}$ in 2013 on natural reefs and from about 2 individuals·$(100\ m)^{-2}$ in 2011 to nearly 15 individuals·$(100\ m)^{-2}$ in 2013 on artificial reefs.

Lionfish are prolific spawners with year-round reproduction and a pelagic larval duration of around 26 d (Morris 2009; Ahrenhold and Morris 2010). With the increasing density of lionfish in the nGOM, there is a high likelihood that larvae could enter the estuaries through the numerous passes and cuts to settle in nearshore nursery habitats. Although lionfish are typically associated with deeper hard-bottom and reef structures, they have been found in shallow seagrass (Biggs and Olden 2011) and mangrove (Barbour et al. 2010) habitats within the Caribbean (Claydon et al. 2012). The smaller size of lionfish collected in these habitats suggests that they may serve as nursery habitats with an ontogenetic shift to offshore hard bottom or reefs with increasing age (Barbour et al. 2010; Claydon et al. 2012, but see Jud et al. 2011). Additionally, and of importance for the nGOM habitats, lionfish have been reported within an estuary in South Florida (Jud et al. 2011), indicating a tolerance to large salinity fluctuations.

Here we report the first occurrence of a newly settled juvenile lionfish in a seagrass bed from a northern Gulf of Mexico estuary. This individual was collected by hand from a shallow (~1 m) mixed turtlegrass (*Thalassia testudinum*) and shoalgrass (*Halodule wrightii*) meadow in Big Lagoon, FL (30°19.188′N, 87°20.087′W) on 20 Sep. 2013. This early juvenile lionfish was well camouflaged within the seagrass meadow (Fig. 1), and its total length was approximately 15 mm (Fig. 2). This same area was repeatedly sampled with a beam plankton trawl on 1 Oct. 2013 but no additional lionfish were collected. The effective camouflage of this individual, coupled with its fragility, could explain why there have been no previous reports of juvenile lionfish from shallow habitats of the northern Gulf of Mexico. Additionally, as suggested by Jud et al. (2011) and Claydon et al. (2012), the lack of sampling effort may contribute to the lack of reports in nearshore habitats, as most opportunistic sightings occur along popular recreational diving sites (e.g. coral reefs and offshore oil and natural gas platforms). Of course, this individual may also have been one of the very first juveniles occurring in seagrass meadows in the area and additional sightings may soon be reported.

With few lionfish predators in the nGOM, if lionfish do become common in Gulf seagrass meadows, they may profoundly and negatively affect the nursery value of seagrass habitat. This is because the few prior studies of lionfish in seagrass, mangrove, and estuarine habitats have found that they are generalist predators, with small shrimp (Palaemonidae and Penaeidae) constituting a large portion of their diet (see Barbour et al. 2010 and Jud et al. 2011). Thus, it can be assumed that economically important crustacean species that use the nGOM seagrass nursery habitat, such as brown and pink shrimp (*Farfantepenaeus aztecus* and *F. duorarum*) and blue crabs (*Callinectes sapidus*), will likely become prey for this voracious predator and that substantial increases in lionfish abundance may contribute to reduced shrimp and crab harvests. Additionally, increases in lionfish abundance may also reduce recruitment success of other juvenile fishes that utilize seagrass meadows for food and refuge, including economically important species such as red drum (*Sciaenops ocellatus*), spotted sea trout (*Cynoscion nebulosus*), and gray (*Lutjanus griseus*) and lane snappers (*L. synagris*) as they compete for prey resources and space. One strategy for controlling lionfish numbers suggested by Biggs and Olden (2011) was to remove them from shallow-water habitats

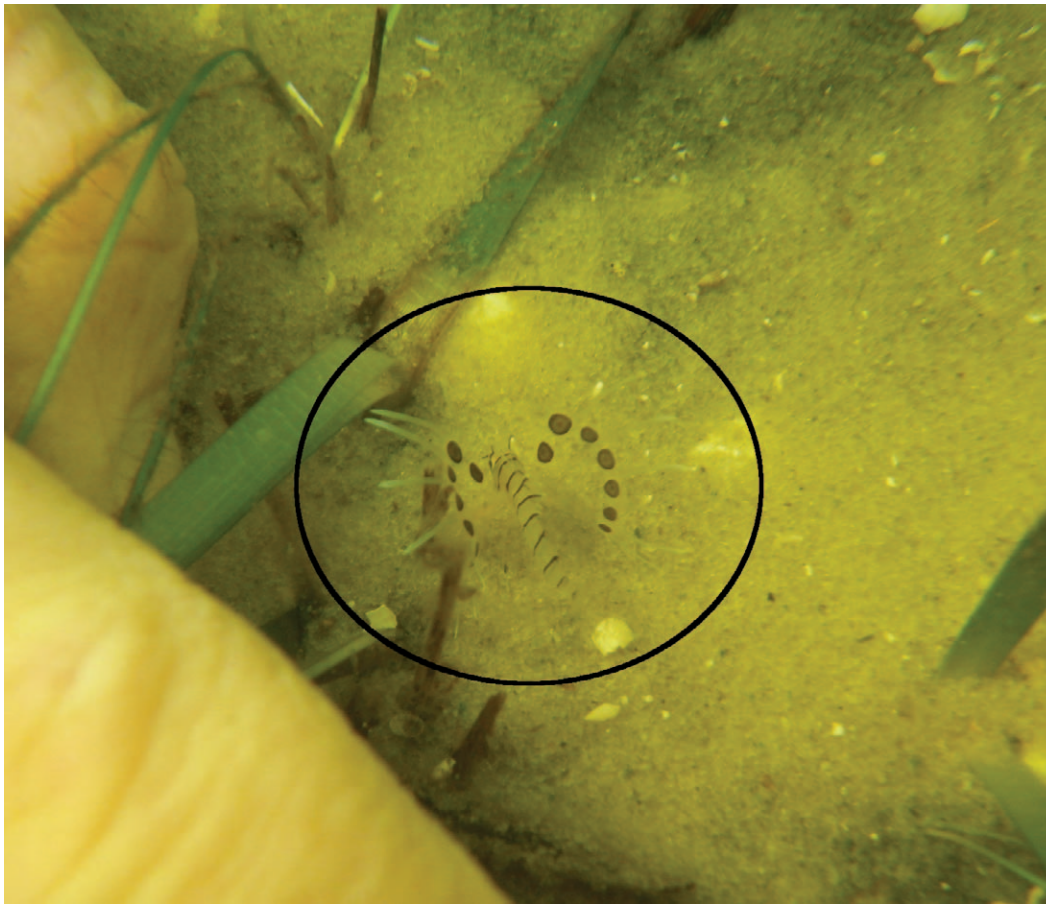

Fig. 1. Newly settled juvenile lionfish found within a mixed turtlegrass and shoalgrass meadow in a northern Gulf of Mexico estuary.

before they reach reproductive age (at approximately 1 yr). The extent to which this would be effective in nGOM seagrass meadows depends on the number of juveniles that will be found in the future and the effort put forth to locate and remove them.


Fig. 2. Juvenile lionfish collected within a northern Gulf of Mexico seagrass bed. Total length measured approximately 15 mm.

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## Literature Cited

Aguilera-Perera, A., and A. Tuz-Salub. 2010. Non-native, invasive red lionfish (*Pterois volitans* [Linnaeus, 1758]: Scorpaenidae) is first recorded in the southern Gulf of Mexico, off the northern Yucatan Peninsula, Mexico. Aquat. Invasions 5(S1):S9–S12.

Ahrenholz, D. W., and J. A. Morris Jr. 2010. Larval duration of the lionfish, *Pterois volitans* along the Bahamian Archipelago. Environ. Biol. Fishes 88:305–309.

Barbour, A. B., M. L. Montgomery, A. A. Adamson, E. Díaz-Ferguson, and B. R. Silliman. 2010. Mangrove use by the invasive lionfish *Pterois volitans*. Mar. Ecol. Prog. Ser. 401:291–294.


DOI: 10.18785/goms.3201.08

Biggs, C. R., and J. D. Olden. 2011. Multi-scale habitat occupancy of invasive lionfish (*Pterois volitans*) in coral reef environments of Roatan, Honduras. Aquat. Invasions 6:347–353.

Claydon, J. A. B., M. C. Calosso, and S. B. Traiger. 2012. Progression of invasive lionfish in seagrass, mangrove and reef habitats. Mar. Ecol. Prog. Ser. 448:119–129.

Dahl, K. A., and W. F. Patterson III. 2014. Habitat-specific density and diet of rapidly expanding invasive red lionfish, *Pterois volitans*, populations in the northern Gulf of Mexico. PLoS ONE 9(8): e105852. doi:10.1371/journal.pone.0105852.

Fogg, A. Q., E. R. Hoffmayer, W. B. Driggers III, M. D. Campbell, G. J. Pellegrin, and W. Stein. 2013. Distribution and length frequency of invasive lionfish (*Pterois* sp.) in the northern Gulf of Mexico. Gulf Carib. Res. 25:111–115.

Jud, Z. R., C. A. Layman, J. A. Lee, and D. A. Arrington. 2011. Recent invasion of a Florida (USA) estuarine system by lionfish *Pterios volitans/P. miles*. Aquat. Biol. 13:21–26.

Morris, J. A. Jr. 2009. The biology and ecology of the invasive Indo-Pacific lionfish. PhD diss., North Carolina State University, Raleigh, NC.

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