Description of a new *Gibberula* species (Volutoidea: Cystiscidae) from eastern Florida

Descripción de una nueva especie de *Gibberula* (Volutoidea: Cystiscidae) del este de Florida

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ABSTRACT

A new *Gibberula* species is described from eastern Florida as *G. redferni* n. sp., and it is compared with closely related species from the Caribbean, Senegal, the Mediterranean Sea, Oman and New Caledonia. The variability of both its shell morphology and its animal chromatism is displayed. *Gibberula redferni* is proposed to belong to the species group of *G. ubitaensis* Espinosa & Ortea, 2000, as defined by McCleery (2009). The possible occurrence of an old Tethyan radiation is discussed, as well as different aspects of the phenetic variability occurring in the *G. ubitaensis* species group.

RESUMEN

Se describe una nueva especie de *Gibberula* del este de Florida, denominada *G. redferni* n. sp., y se compara con especies estrechamente relacionadas del Caribe, Senegal, el mar Mediterráneo, Omán y Nueva Caledonia. Se muestra la variabilidad tanto de la morfología de su concha como de su cromatismo animal. Se propone que *Gibberula redferni* pertenece al grupo de especies de *G. ubitaensis* Espinosa & Ortea, 2000, según definido por McCleery (2009). Se discute la posible existencia de una antigua radiación del Tetis, así como diferentes aspectos de la variabilidad fenética presente en el grupo de especies *G. ubitaensis*.

KEY WORDS: Cystiscidae, *Gibberula*, Eastern Florida, Caribbean, phenetic variability, sibling species, species radiation.
PALABRAS CLAVE: Cystiscidae, *Gibberula*, este de Florida, Caribe, variabilidad fenética, especies hermanas, radiación de especies.

INTRODUCTION

Gibberula is a genus of small marginelliform gastropods, represented in the world's tropical and warm-temperate waters by 270 extant species (WoRMS, 2026) of which over two-thirds have been described since the beginning of this century. Representatives of this genus from the shallow waters of Florida

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Figure 1. Number of species of small *Gibberula* species with undecorated shells described from the Caribbean (data from WoRMS, 2026)

Figura 1. Número de especies de Gibberula *pequeñas con conchas sin decoración descritas en el Caribe (datos de WoRMS, 2026).*

(shoreline environments) have never been subject to specific descriptions and they have been routinely attributed until now to *Gibberula minuta* (Pfeiffer, 1840), described from Cuba, or to *Gibberula lavalleeana* (d'Orbigny, 1842), described from Jamaica and Martinique, both species described originally in the genus *Marginella* Lamarck, 1799. *Marginella minuta* Pfeiffer was found to fall in homonymy with *M. minuta* Gray, 1829, described from Australia, and it was renamed by Faber (2004) as *Gibberula pfeifferi*, with the designation of a lectotype with four paralectotypes (two of them said to be conspecific and two other two non-conspecific) among the type lot of *Marginella minuta* Pfeiffer deposited in Berlin Museum. The designated lectotype of *Marginella minuta* Pfeiffer (Faber, 2004: figs. 87–88) is an oval-rounded shell of 2.5 mm, with an arched labrum and a quite reflected inner lip, but only one of the "conspecific paralectotypes" (Faber, 2004: figs. 91–92) seems to match this shell morphology. The other "conspecific paralectotype" (ibid: figs. 89–90) clearly belongs to another species, with turbiniform outline, more massive and produced spire, straight oblique labrum with double-slope angular shoulder, narrower aperture, and more notched siphonal canal. The two other non-conspecific paralectotypes of *M. minuta* Pfeiffer (figs. 93–96) are attributed by Faber to *Gibberula lavalleeana*, but no rationale relating to the original definition of that species is given. In fact, *G. lavalleeana* has not been revised until now and its identity remains unclear: the type material of *G. lavalleeana*, deposited in the British Museum, is composed of three adult shells clearly belonging to three different species, and of two juvenile specimens that are hardly identifiable. Furthermore, *G. lavalleeana* was described from "Jamaica and Martinique", and no data allows linkage of any syntype to a particular locality, the whole set being labelled "Jamaica" on the Museum tablet. A revision of the *Gibberula lavalleeana* concept is being undertaken by the first author, and this issue will be addressed via a Monography about the Caribbean marginellas described by d'Orbigny (1842).

As a matter of fact, the tiny *Gibberula* are known to have a narrow distribution, more especially in the Caribbean Province (ESPINOSA & ORTEA, 2000; COSSIGNANI, 2006; ESPINOSA & ORTEA, 2006; ESPINOSA & ORTEA, 2007; MCCLEERY, 2008; MCCLEERY, 2009; ESPINOSA, ORTEA & CABALLER, 2011; REDFERN, 2013; ESPINOSA & ORTEA, 2014; ORTEA, 2015; ORTEA, 2017; COSSIGNANI & LORENZ, 2019; ESPINOSA & ORTEA, 2019; ORTEA, 2022) (Fig. 1). All those taxa were found to have very restricted ranges and it is highly unlikely that *Gibberula minuta* Pfeiffer (now *Gibberula pfeifferi* Faber), described from Cuba, and *Gibberula lavalleeana* d'Orbigny, described from Jamaica or from Martinique, could be distributed also in Florida. Therefore, it seems that the *Gibberula* of Florida belongs to undescribed species. The present article is devoted to the description of a *Gibberula* species studied in the shallow waters of the Indian River Lagoon, on the eastern Florida coast, as a first step of a more general review of the *Gibberula* fauna of the whole Florida Peninsula, currently under way by the authors.

MATERIAL AND METHODS

In January-April 2025, the second author conducted field samplings to three locations within the Indian River Lagoon, seeking live populations of *Gibberula*: Port Canaveral Inlet in the North, Sebastian State Park Inlet as middle site, and Fort Pierce Inlet in the South. Higher focus was applied to the populations of the Sebastian State Park, in rather protected spots. Other specimens were collected in the Sebastian Inlet by Marlo F. Krisberg, Phil Poland and John Wise, and further specimens were collected by Marlo Krisberg at Fort Pierce, as well as at Peanut Island (Riviera Beach, Lake Worth Lagoon, north of Palm Beach) and in the Florida Keys. Three areas were explored by the second author in the Sebastian Inlet, at the North Side, the South Side and the Southwest side. All the specimens were sampled by brushing pieces of rocks and boulders in a bucket filled with seawater, the pieces being partially covered by foam and algae, encrusted by sessile organisms, and removed from the low tide level down to 6 feet.

Ninety-eight specimens were subject to a morphometric study, including 74 specimens studied in live condition from the Sebastian Inlet, and 24 further specimens collected from Peanut Island by Marlo Krisberg. The specimens from the Sebastian Inlet were photographed with a digital camera under sun light, crawling in few millimetres of seawater in plastic cups. Some specimens were preserved in 90% ethanol, and the remaining specimens were dried. Some specimens from Fort Pierce and from the Florida Keys were also photographed in live condition by Marlo Krisberg, but the specimens collected off Peanut Island were not photographed.

Abbreviations used:
BMM: Bailey-Matthews Museum (Sanibel Island, FL, USA).
FMNH: Florida Museum of Natural History (Gainesville, FL, USA).
MHNG: Muséum d'Histoire Naturelle de Genève, Switzerland.
FBC: Franck Boyer collection.
WFC: Wayne Frenzel collection.
MKC: Marlo Krisberg collection.
ad: adult
spm: specimen
L: shell length

RESULTS

All the *Gibberula* specimens studied from the Indian River Lagoon (Sebastian Inlet and Fort Pierce), on the ground of their animal chromatism, prove to belong to the same species, quite homogeneous for its shell morphology and very homogeneous for its animal chromatism. Concluding this *Gibberula* species was undescribed, we propose hereafter its description and the comparison with similar species and forms from Caribbean and some other regions. The similar population collected in the northern Florida Keys presents some phenetic differences with our new species, and its taxonomic status is discussed.

SYSTEMATICS

Class Gastropoda Cuvier, 1795
Superfamily Volutoidea Rafinesque, 1815
Family Cystiscidae W. Stimpson, 1865
Subfamily Persiculinae G.A. Coovert & H.K. Coovert, 1995

Genus *Gibberula* Swainson, 1840

Type species: *Gibberula zonata* Swainson, 1840 (junior synonym of *Volvaria oryza* Lamarck, 1822), by monotypy.

Gibberula redferni n. sp. (Fig. 2)

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Type material: USA, eastern Florida, Indian River Lagoon • 1 ad spm (Figs. 2A-D, L = 2.2 mm × 1.3 mm); Sebastian Inlet North #6; 27.859°N, -80.449°W, shallow water; Wayne Frenzel leg. 04-01-25; MHNG-MOLL-159804. Paratypes (Figs. 2E-K), same station as the holotype • 14 ad spm; FBC • 20 ad spm; WFC • 20 ad spm; MKC • 19 ad spm; FMNH.
Other material examined: USA, eastern Florida • 22 spm, Sebastian Inlet, Indian River Lagoon; MKC (1999 sampling) • several spm, Sebastian Inlet, Indian River Lagoon; collections Phil Poland and John Wise • several spm, Fort Pierce, Indian River Lagoon; MKC • 24 ad spm; Peanut Island, Lake Worth Lagoon; 26.773°N, -80.042°W; lot 1; MKC • 109 spm, Peanut Island, Lake Worth Lagoon, lot 2; MKC.
Type locality: Sebastian State Park Inlet, eastern Florida.
Derivato nominis: after Colin Redfern, for his prominent works about the marine molluscan fauna of the Bahamas, including the report and illustration of several *Gibberula* forms matching closely our new species.

Description: Shell morphology (Figs. 2A-D): Outline rather oval, spire moderately elevated, protoconch large, wide and dome-shaped, of 1.25 whorl. Teleoconch of about 1 whorl, with quite rounded body whorl, slightly subpyriform, labrum moderately arched in its upper part, slightly oblique and about straight in its lower part, slightly sloping labrum shoulder, lip somewhat thickened at its mid-part, thinner at its upper and lower parts, a dozen of rough flat denticles inside the labrum. Aperture moderate, of equal width along its length, anal canal quite long and moderately incised; six columellar plaits, the lower one rather thin, oblique and straight, the second plait longer, thicker and slightly bent, the third plait thick and shorter, the three upper plaits subequal, short, very oblique and packed; siphonal canal rather strongly notched; shell material vitreous white, except for the ventral side of the base of the last whorl, the columellar wall and the labrum which are opaque white.

Animal (Figs. 2G-K): Slit head with short tentacles, large foot, no apparent mantle covering the shell during activity (daytime observations); soft parts background vitreous white; a black stain on the internal side of the eyes, a transversal black stain running from the base of the tentacles across the frontal lobes, an orange stain ahead of the eyes, no colour marks on the tentacles; a radiating series of white spots pointing towards each side of the frontal side of the foot, with few small orange and black stains around, two longitudinal flocks of white flakes on the metapodium, with few orange spots and many black stains in the interval; internal mantle with a meadow-green background, spotted with medium-sized rounded orange flakes circled with a black edge, few quite big deep-white blotches fringed with deep-black streaks, under the ante-

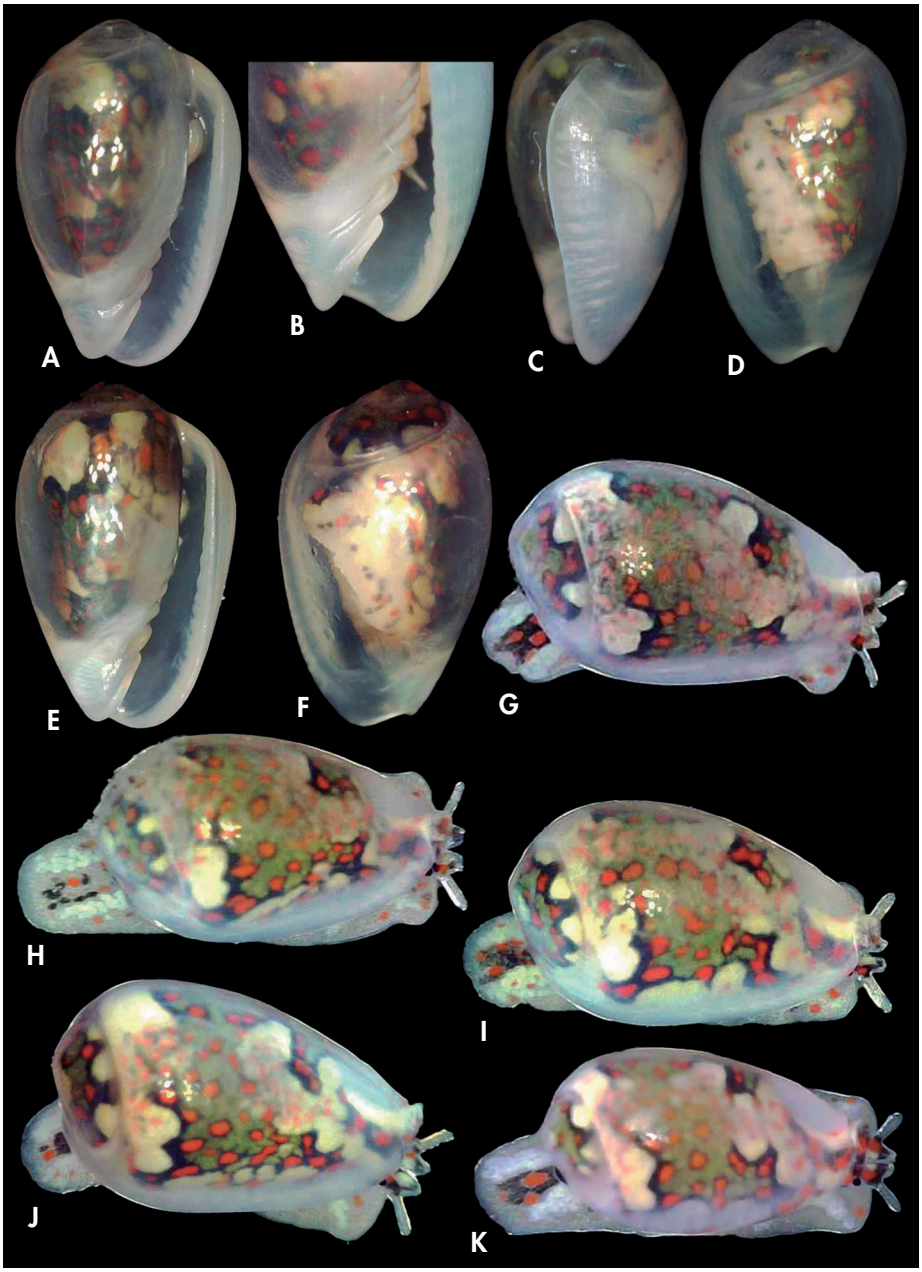

Figure 2. *Gibberula redferni* n. sp. from Sebastian Inlet North, Florida. A–D: holotype MHNG-MOLL-159804, L = 2.2 mm; E–G: paratype, L = 2.0 mm, WFC; H: paratype, L = 2.1 mm (14 Apr. 2025), WFC; I: paratype, L = 2.1 mm, WFC; J: paratype, L = 2.2 mm, BBM; K: paratype, L = 1.6 mm (11 April 2025), FMNH.

Figura 2. Gibberula redferni *n. sp. de Sebastian Inlet North, Florida. A–D: holotipo MHNG-MOLL-159804, L = 2,2 mm; E–G: paratipo, L = 2,0 mm, WFC; H: paratipo, L = 2,1 mm (14 de abril de 2025), WFC; I: paratipo, L = 2,1 mm, WFC; J: paratipo, L = 2,2 mm, BBM; K: paratipo, L = 1,6 mm (11 de abril de 2025), FMNH.*

rior and the posterior parts of the body whorl, and on the right side of the mantle, smaller white patches fringed with black under the previous whorl, just above the suture.

Variability (Fig. 2): As far as the type material is concerned, the shell morphology of *G. redferni* n. sp seems to be rather constant. However, the specimens collected by Marlo Krisberg in the Sebastian Inlet in 1999 display a greater variability for their size and for their shell morphology, either with stouter rounded shells, or somewhat turbiniform shells, or even slightly subcylindrical shells, as well as lower spires. On the other hand, slightly larger shells with more slender shapes were observed in the north of the Indian River Lagoon (Port Canaveral), and stouter shapes tend to be more frequent at the south end of this lagoon (Fort Pierce). These specimens were not checked for their animal chromatism, so we were not able to verify if the shell disparity observed in these specimens came from a higher intraspecific variability, or if it resulted from the occurrence of several different species in these places at that time. The same question is occurring for the *Gibberula* specimens collected by Marlo Krisberg at Peanut Island (Lake Worth Lagoon), where the shells are more diverse in length, size, and morphology. The shell length of adult specimens collected in the Sebastian Inlet (our type material: 2025 samplings by the second author) is ranging from 1.7 mm to 2.3 mm, the average length being of 2.1 mm. More remarkable is the very limited variability of the animal chromatism: live animals observed from Sebastian Inlet (Figs. 2G-K) as well as from Fort Pierce (not illustrated) present a very homogeneous chromatic pattern of the soft parts, more constant in the details than what was observed in most of the other tiny *Gibberula* species documented from the Caribbean, West Africa or the Indo-Pacific.

Distribution and habitat: *Gibberula redferni* n. sp. is reported from the Indian River Lagoon, where it was collected in algal turf and algae on rocks at shallow water levels (from 0.5 m down to 4.0 m). In the present state of knowledge, *G. redferni* seems to be the only *Gibberula* species in the Sebastian Inlet, and possibly in the Indian River Lagoon. The *Gibberula* populations ranging northwards up to the Carolinas were not documented, and the higher shell variability observed from Peanut Island (northern part of the Lake Worth Lagoon) suggests that other *Gibberula* species might range sympatrically with *G. redferni* in this lagoon, and possibly also in the Sebastian Inlet in past occurrences. A similar form documented from the Florida Keys by Marlo Krisberg, with quite tiny oval squat shells and more numerous white rounded blotches spreading over the whole internal mantle, is considered for now as a possible sibling species, as well as another form from north-western Florida (live specimen from Panama City pictured in iNaturalist.org) with somewhat turbiniform shells with strong shoulder, low spire and rather stretched white patches on the internal mantle. These different forms are under study by the authors.

DISCUSSION

Gibberula redferni n. sp. belongs clearly to the species group of *G. ubitaensis* Espinosa & Ortea, 2000, described from Caribbean Costa Rica and said to be distributed as far south as the Caribbean coast of Panama. This species group was defined by McCleery (2009) and it is characterized by internal mantle with a greenish background, conspicuous medium-sized orange spots and more or less extensive milky-white blotches fringed by black streaks. According to McCleery, this species group is distributed in the western Caribbean Sea, from Cuba to Colombia, and it is suspected to be absent from the rest of the Greater Antilles, Florida, the Bahamas, the Lesser Antilles and

Venezuela. McCleery accepted in this group the species *G. hirami* Espinosa & Ortea, 2007 and *G. baisrei* Espinosa & Ortea, 2007 from Cuba (*G. olivai* Espinosa & Ortea, 2005, also described from Cuba, being reported with reservations); *G. farlensis* McCleery, 2009 from Belize; *G. sierrai* Espinosa & Ortea, 2000 from Costa Rica; *G. ubitalta* McCleery, 2009, *G. crassa* McCleery, 2009 and *G. macula* McCleery, 2009 from southern Panama (San Blas Islands) or the offshore islands of Colombia.

In fact, the species group of *G. ubitaensis* is much more widespread and diversified throughout the Caribbean, and McCleery was wrong from that point of view, speculating in a negative way about regions not documented at that time, and strangely neglecting some obvious species he described himself shortly before . The following Caribbean species can be added without reservations to the species group of *G. ubitaensis*, besides the three Floridian forms commented right here: an important series of seven undescribed species illustrated from Abaco Island (Bahamas) by REDFERN (2013: 180–184), and two forms from Abaco identified as belonging to the Cuban species *G. hirami* and *G. olivai* (but without picture of the animal chromatism, and with unsure shell identification according to us and to Redfern himself (p. 180); another bunch of species described from Cuba including *G. nilsi* Espinosa & Ortea, 2007, *G. ramsi* Espinosa & Ortea, 2007, *G. palmasola* Espinosa, Ortea & Caballer, 2011, and *G. norvisae* Espinosa & Ortea, 2014; *G. stella* McCleery, 2008 described from Honduras and Nicaragua; *G. occidentalis* McCleery, 2008 described from Honduras to Panama; *G. bribri* Espinosa & Ortea, 2000 and *G. sierrai* Espinosa & Ortea 2000 described from Caribbean Costa Rica; *G. soniae* Espinosa & Ortea, 2019 and *G. eugeniae* Espinosa & Ortea, 2019 described from Pacific Costa Rica; *G. celerae* McCleery, 2008 described from Isla Coche, Venezuela, and *G. conejoensis* McCleery, 2008 described from Los Testigos Island; about ten of the species described from Guadeloupe by Ortea (2015); and finally at least two species described from Martinique as *G. charpentierae* Ortea, 2022 and *G. doudnae* Ortea, 2022. Besides these evident relatives closely matching *G. ubitaensis* for their animal chromatism, many derived forms seem to occur throughout Caribbean, like for instance most of (if not all) the numerous other species described by McCleery in 2008 from western and southern Caribbean Sea, or *G. rowlingae* Ortea, 2015 described from deep levels of Guadeloupe and reported later from deep levels of Martinique (ORTEA, 2017). As a matter of fact, the *G. ubitaensis* species group looks to be by far the most abundant *Gibberula* group from Caribbean.

However, the *G. ubitaensis* species group seems to spread well-beyond Caribbean, as species with very similar animal chromatism are recognized from some remote places, such as *G. diadema* Pin & Boyer, 1995 from Dakar, Senegal, *G. philippii* (Monterosato, 1878) from Mediterranean and possibly northwest Morocco and the Canary Islands [Boyer & Renda (2022)], *G. undulata* Boyer, 2025 from Masirah Island, Oman, and an undescribed species from New Caledonia reported as "*Gibberula* sp. aff. *philippii* morph A" in BOYER (2003: 247, figs 17–18, 24). From this point of view, the species group in which *G. redferni* belongs seems to result from an old Tethyan radiation, with most of its Recent representatives ranging in the Caribbean Sea.

The comparison of our new species *G. redferni* with all the species recognized in its species group would be quite fastidious, and mainly superfluous. Besides a comparison with *G. ubitaensis*, the pivotal species of the group, we shall compare *G. redferni* only with species from this species group presenting high similitudes for the shell features, and with other species most similar for the animal chromatism.

In its original description from a population of Costa Rica (ESPINOSA & ORTEA, 2000: 97–99, figs 2A & plate 1), *G. ubitaensis* differs from *G. redferni* mostly by its shell features, with a suboval shell

outline, a straight labrum, a low spire absorbed into the upper part of the parietal callus, a thick and stepped columellar callus, and four flattened columellar plaits partially subsumed in the columellar callus. On the other hand, the internal mantle of *G. ubitaensis* somewhat resembled that of *G. redferni*, except for the orange spots ranging only within the black fringe on the periphery of the green ground (vs. mostly within the green area in *G. redferni* n. sp.), and for the black ground of the internal mantle under the spire, without green shade; the colour pattern of the foot is also quite different, with black sectors not seen in *G. redferni* n. sp. But the features pictured by McCleery (2009: figs 1–10, fig. 41) for the populations from Panama (Bocas del Toro) he recognizes as *G. ubitaensis* differs substantially from the typical form of this species, with an obsolete spire and no parietal callus, a squat club-shaped outline and convex lower columella at the level of the plaits. The colour pattern of the internal mantle is very similar to that of *G. redferni*, although the frontal lobes of the head are fully white. We infer that this population from Panama belongs in fact to an undescribed species.

For its shell features, *G. redferni* resembles mostly six species from its group: *Gibberula* sp. F in Redfern (2013: 180; figs. 515A–C), described from Abaco Island, Bahamas, has however a less shouldered labrum and more prominent labial denticles, the internal mantle differs by light orange medium-sized spots on a greyish ground (versus bigger deep orange spots on a meadow-green ground), and quite smaller and more numerous white blotches distributed under all the body whorl (versus fewer larger white blotches distributed under the periphery of the body whorl); *G. nilsi* Espinosa & Ortea, 2007, described from Cienfuegos, Cuba, with a very similar shell morphology but with larger white blotches, most packed in long patches, covering ¾ of the internal mantle, which is fully white under the spire; *G. palmasola* Espinosa, Ortea & Caballer, 2011, described from Pinar del Rio, Cuba, also with a similar shell, but with a wider aperture, the base of the columellar edge being concave with only three apparent plaits, a more shouldered labrum, an internal mantle with much smaller white blotches and similar deep orange spots on a beige ground; *G. farlensis* McCleery, 2008, described from Belize, with a slightly more oval shell outline, smaller white blotches, partially fragmented and distributed over the whole greenish ground of the internal mantle; *G. eugeniae* Espinosa & Ortea, 2019 from Pacific Costa Rica, which has a similar chromatic pattern of the mantle but is geographically isolated; *G. veilae* Ortea, 2015 described from Guadeloupe, with thinner, shorter and lower columellar plaits, straighter labrum, smaller labial denticles, more numerous and more prominent on the inner edge of the labrum, internal mantle with smaller orange spots, some tiny orange flecks and stains speckling the white blotches, very few small white patches under the spire. *Gibberula aureliae* Ortea, 2017, described from Martinique, is quite similar to *G. redferni* for its shell morphology (however with a slightly more oval outline, four stronger and more spaced columellar plaits, the second plait being much more horizontal, stronger and more prominent labial denticles on the inner labial edge), but it is totally differing for its animal chromatism, with a medium-blue internal mantle mottled by thin reddish flecks. Despite being quite similar to *G. redferni* for its shell morphology, *G. aureliae* may well belong to another species group.

G. redferni is less similar with four species for their shell morphology, but very similar for their animal chromatism: *G. pignonae* Ortea, 2015, described from Guadeloupe, has a smaller club-shaped subcylindrical shell outline, a very low spire and a straight labrum, but its internal mantle differs from that of *G. redferni* only by white patches flecked by orange dots spreading over the centre of the mantle; *G. sierrai* Espinosa & Ortea, 2000, described from Costa Rica, has also a club-shaped subcylindrical shell outline, a more slender

shape, a much smaller spire, a more shouldered labrum and the upper part of the aperture tilted backwards, with a wide and deep anal canal, but its animal chromatism differs only by the presence of more black marks on the internal mantle and on the head, small lateral black spots on the foot, and the absence of colour decoration on the posterior part of the metapodium; *G. crassa* McCleery, 2009 from San Blas Islands, Caribbean Panama, which presents about the same range of chromatic variability as *G. ubitaensis*, with one of its phase being close to the animal chromatism of *G. redferni*; *G. conejoensis* McCleery, 2008, described from Los Testigos Island, eastern Venezuela, has a quite club-shaped shell outline, a low rounded spire and a straight labrum, and he has about the same animal chromatism as *G. nilsi*, but with the green, orange, white and black decoration occurring under the spire (versus fully white pattern in *G. nilsi*).

CONCLUSION

The recognition of the *G. ubitaensis* species group can be considered as an important step for the understanding of the taxonomical structure of the genus *Gibberula*, studied as an indistinct whole until now. The recognition of this important species group will help probably to the recognition of further *Gibberula* groups in the future.

We insist on the fact that the phenetic unity of this species group is founded on the main features of its animal chromatism (internal mantle), not on the shell morphologies, which look to be very differing from one species to another in many cases. Another point is that the animal chromatism looks to be very constant in some species belonging to the *G. ubitaensis* species group (such as our new species *G. redferni* from eastern Florida), whereas some species look to have a noticeably more variable animal chromatism [for instance *G. undulata* from Masirah Island, Oman: see in BOYER (2025: figs 1C, 1K, 1N)], and other species display a very variable animal chromatism [such as *G. philippii* from Mediterranean, with two "alternate phases" besides the most usual pattern (BOYER & RENDA, 2022: figs. 304–313)].

A remarkable point must be highlighted here, about cases of sibling species displaying animal chromatism poorly differing from one to another, but having much contrasted shell morphologies, what is typically occurring in Abaco Island, Bahamas, and conspicuously illustrated by REDFERN (2013: 180–184). Such a situation is inviting students to large-scale samplings and picturing, and to careful comparisons in the field, in view to recognize cases of sibling species in this species group, such occurrence being apparently frequent (MCCLEERY, 2008; 2009; ORTEA, 2015; BOYER, 2003; 2025).

Radular morphologies proving to be poorly discriminating among tiny *Gibberula* species, the use of molecular tests would be of great help in many cases for recognizing sibling species as well as intraspecific variability ranges. To apply molecular investigations to the *Gibberula* fauna would allow also to identify species groups as well as species complexes, verifying for instance if the tiny *Gibberula* species with glassy/undecorated shells all belong to the *G. philippii* complex (sensu BOYER, 2003), besides a complex of decorated shells typified by *G. oryza* (Lamarck, 1822), or if more diversified *Gibberula* complexes must be recognized, potentially leading to large-scale taxonomical inferences. At last, molecular tests on some selected cystiscid species would allow to clarify the phyletic relations between the Cystiscinae and the Persiculinae, roughly tackled for now but deserving much deeper inquiries (COOVERT & COOVERT, 1995; BOYER, 2019; FEDOSOV ET AL., 2019; BOYER, 2024; 2025).

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