

Interception of the egg sac of the Spiny-backed Orbweaver *Gasteracantha cancriformis* (Linnaeus, 1758) in the United Kingdom on produce from Costa Rica (Araneae: Araneidae)

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Abstract: An egg sac of the non-native spider *Gasteracantha cancriformis* (Linnaeus, 1758) (Araneidae) found on the leaf of an imported shrub *Heptapleurum arboricola* Hayata (Araliaceae) from Costa Rica is described and illustrated following its interception in the United Kingdom.

Keywords: biosecurity, imported, non-native, Central America

Introduction

Gasteracantha cancriformis (Linnaeus, 1758) is distributed across North America, Central America, Caribbean and South America (World Spider Catalog, 2025) with suggestions of diversification from a Mexican ancestor originally (CHAMBERLAND et al. 2020). Adults are recognized by their vivid and polymorphic colouration (Fig. 1A) and typically spinose abdominal projections both of which play roles as attractants or repellents for predators and prey (MACHAROENBOON et al. 2021). The egg sacs produced by females, however, are equally striking being constructed of neon yellow, nylon-like, silk threads, ovate and “green striped” (MUMA 1971). In Florida citrus groves, females typically deposit eggs on the underside of leaves adjacent to their web (MUMA 1971), providing some insight into egg laying behaviour of the species in their natural habitat. Such a habitat in theory is likely to be visually complex, vegetation rich and structurally heterogeneous supporting considerable biodiversity and hosting a range of predators, such as ants, parasitoid wasps, and predatory insects and to a lesser extent avifauna and mam-

mals. The morphology of the eggs sac must provide multiple evolutionary advantages against predators.

In this work, we report an intercepted egg sac of *G. cancriformis* found on a shrub from Costa Rica imported into the United Kingdom and discuss possible evolutionary reasons for the striking colouration of the egg sacs of this species.

Results

On 5th August 2024, the UK Plant Health and Seeds Inspectorate intercepted an egg sac on a leaf of a Dwarf Umbrella plant, *Heptapleurum arboricola* Hayata (Araliaceae; syn. *Schefflera arboricola*), imported from Costa Rica. The egg sac was submitted to the Fera entomology diagnostics team, where the eggs were confirmed through molecular sequencing as belonging to the Spiny-backed Orbweaver *Gasteracantha cancriformis* (Linnaeus, 1758) (Araneidae). This was further supported by examination of spiderlings which later hatched from the egg sac (Fig. 1B). The egg sac of this species (Fig. 2) is distinctive and as far as current knowledge extends there is no suggestion as to the evolutionary advantages of the egg sac's distinct coloration.

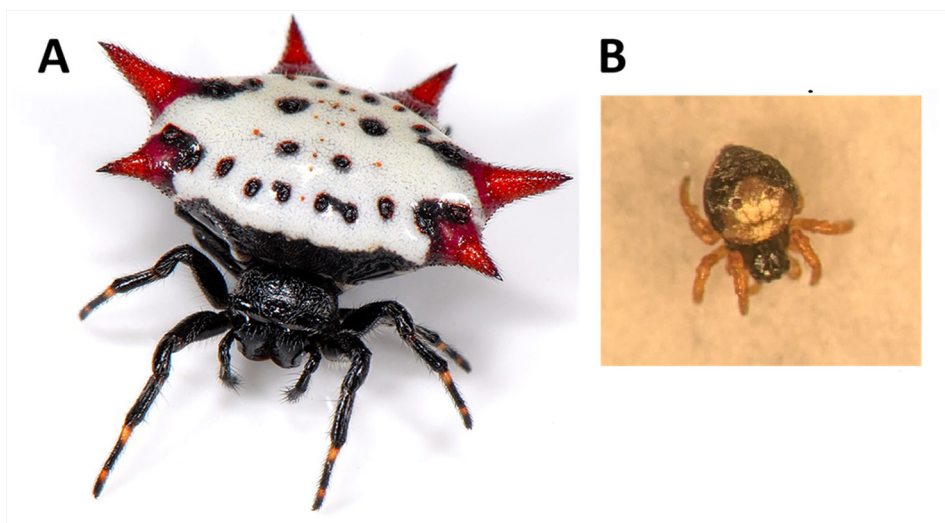


Fig. 1: *Gasteracantha cancriformis* (Linnaeus, 1758). A adult female, white colour form, from Bermuda, B freshly-emerged spiderling from intercepted egg sac.

Photo credits: Fig. 1A Creative Commons Attribution 2.0 Generic, courtesy of Sam Fraser-Smith. Fig. 1B © FERA.



Fig. 2: *Gasteracantha cancriformis* (Linnaeus, 1758) egg sac, intercepted on produce in the United Kingdom from Costa Rica. © Chris Malumphy.

Discussion

The bright coloration of the egg sac may function as a warning signal (aposematism); vivid colours are often associated with toxicity or danger and the neon yellow hue could trick predators into perceiving the sac as unpalatable, even if it lacks chemical defences. The colouration may also serve a camouflaging role. In forests with dappled light, the neon colour could mimic the sunlight reflecting off leaves, making it less obvious to predators that rely on movement or subtle changes in contrast. Meanwhile, the dark green silk line running through the centre of the egg sac could mimic the veins of a leaf or a plant stem, further obscuring the egg sac's true form. This disruptive coloration works to break up the outline of the egg sac, perhaps blending it into the surrounding foliage and reducing the chances that predators such as parasitoid wasps will recognize it as a target.

Interestingly, the egg sac of *G. cancriformis* bears a striking resemblance to certain venomous Lepidoptera larvae. Most of the venomous Lepidoptera of the world are associated with communities of arboreal plants, irrespective of biome (BATTISTI et al. 2024). The Limacodidae (Zygaenoidea), better known as Slug Moths, are an example, with larvae that are often vividly coloured and armed with stinging, urticating hairs arising from scoli that can protect against birds (GRANT 2007). Other studies have shown evidence that limacodid larvae can defend against insects like assassin bugs and paper wasps (MURPHY et al. 2009). The spider egg sac may unintentionally (or intentionally through mimicry) resemble these caterpillars, potentially confusing predators into avoiding the egg mass, mistaking it for a venomous or distasteful prey item like a limacodid larva.

Many spiders have excellent ultraviolet (UV) vision, and bright colours, especially neon yellows, are often highly reflective under ultraviolet light. If the neon colour reflects UV light, it could make the egg mass more visible to the female spider, helping her keep track her eggs in a complex forest environment. It might also help the spider identify the location of her webbing in low light conditions, such as early morning or late evening in a dense forest. Furthermore, the dual combination of neon yellow and green likely serves an additional predator-confusing function. Insects such as ants and parasitoid wasps rely on UV vision. The stark contrast between the reflective yellow silk and the darker green stripe may create a confusing visual pattern that makes it harder for predators to visually lock onto the egg sac as a potential food source or host for parasitism.

Therefore, the coloration and morphology of *Gasteracantha cancriformis* egg sacs likely serves multiple defensive purposes, from camouflage and mimicry to warning signals and visual confusion, enhancing the survival chances of the spider's offspring in a predator-rich environment. Though no formal studies have yet explored these traits in depth, these characteristics fit well within broader categories of antipredator defences observed in other invertebrate species. The intercepted egg sac reported here represents the first published, record of interception of a *Gasteracantha* egg sac in the United Kingdom. Thus, one more species can also be added to the formal list of imported non-native spiders (SHERWOOD 2025).

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