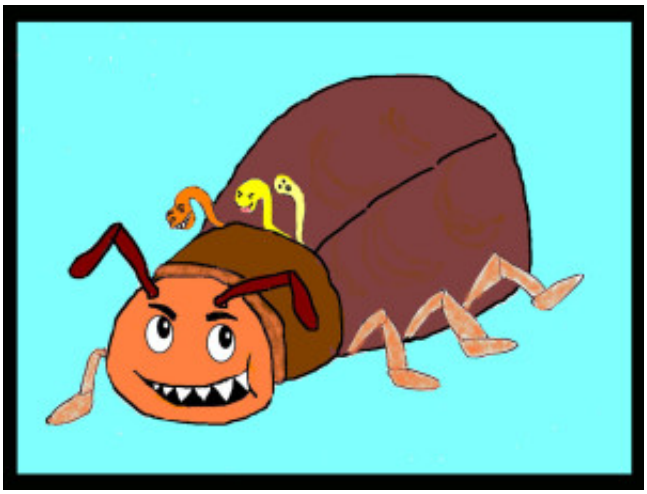
The tiny riders

Nematodes have evolved tremendously to occupy diverse niches while inhabiting all possible habitats on earth. Besides being usually categorised as parasitic or free-living forms they can further show diverse types of feeding guilds and associations. Diplogastrids represent one such group which shows a variety of forms including the predators and bacterivores. Several bacterivores demonstrate intricate relationships with insects which can be manifested in phoretic, necromenic or pathogenic implications to the insects. *Goffartia* is one such genus which represents quite tiny and slender nematodes with inconspicuous morphologies that can be easily overlooked by any sample analyst. That is the reason; this relatively common nematode has not many regular records of occurrence from different parts of the world. Unlike the stoma/buccal cavity of most diplogastrids, it has a relatively narrow, apparently unarmed stoma with an unobtrusive stegostom.



The genus was erected in 1952 by Hirschmann who described *G. heteroceri* as its type species. *Goffartia* is represented by five species namely *G. heteroceri*, *G. africana*, *G. variabilis*, *G. praepilata* and *G. phalacra.* The diversity of the taxon is reflected by the species being reported from a wide range of climatic conditions: tropical (*G. phalacra*), moderately subtropical (*G. africana*) to temperate and even polar (*G*. *heteroceri*; *G. praepilata* and *G. variabilis*). The representative species reported from aquatic habitats or from the locations inhabited by the beetles also verify that many fresh water nematodes demonstrate phoresis, an interspecific and temporary relationship. Two species *viz*., *G. heteroceri* and*. G. variabilis* show conspicuous association with beetles. The type species *G. heretoceri* named on its beetle associates, *Heterocerus* spp. (*H. fenestratus*, *H. fusculus*, *H. marginatus*) of family Heteroceridae, demonstrates phoresis when third stage juveniles take on to the burrows of beetles and ride on them (carriers) by crawling into the ventral crevices between thoracic segments. The juveniles remain attached to the carrier till it dies or can also be transported to any aquatic body. It is only after leaving the carrier's body the juveniles transform into adults and mate thus giving rise to next generation of juveniles. This is a type of unusual association in phorecy which shows slightly lengthy companionship exhibiting overwintering or diapause in rider and a more or less obligate relationship with the carrier. Other beetle species

serving as carriers of *G. heteroceri* belong to families Carabidae (*Stenolophus teutonus*) and Staphylidae (*Paederus riparius*). *G. variabilis* shows phoretic association with another Carabid beetle, *Elaphrus riparius,* however, no such associations have been reported for other species of *Goffartia* though the possibility of their occurrence cannot be ruled out in view of the habitats they have been collected from.

Thus phoresis is not a chance encounter but involves a lot of specificity between the nematode riders and the insect carriers. Owing to the inconspicuous morphology and size, an effective comparison of the species of *Goffartia* was inevitably necessary. The present publication revises the comparative diagnostic characters of the species of the poorly-understood and largely ignored taxon in the light of original descriptions and subsequent reports. The study can further open avenues for exploitation of such associations in biomanagement of pests.

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Publication

A taxonomic review of the genus Goffartia Hirschmann, 1952 (Rhabditida: Diplogastridae) with a note on the relationship of congeners.
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