Biology of UnderGround Symbioses (BUGS): studies of a subterranean ant-aphid-microbe cooperative network

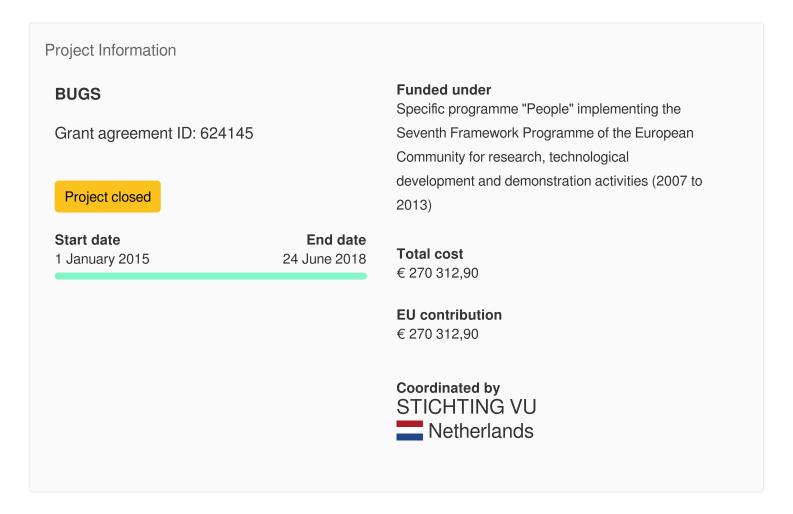


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# Biology of UnderGround Symbioses (BUGS): studies of a subterranean antaphid-microbe cooperative network

#### **Fact Sheet**



# **Objective**

Mutualism, cooperative interaction between different species, is widespread in nature. Despite its ubiquity and recognised importance for ecological communities, how mutualism evolves and persists remain major unresolved questions in

evolutionary biology. The reason for this is that mutualistic interactions can often be exploited by parasites, and high degrees of species interdependence can increase extinction risk. Applying established network theory to interpret biological details of mutualistic interaction networks has great potential to reveal crucial system properties such as enhanced network resilience through species interdependence. I propose an interdisciplinary study combining network theory with detailed empirical analyses of a so far uncharacterised mutualistic network of subterranean ants, aphids and microbes. The ants protect aphids from predators, and in turn harvest honeydew, processed plant sap excreted by the aphids. In addition, symbiotic gut bacteria in both ants and aphids synthesise essential amino acids and assimilate nitrogen. These bacteria are crucial for upgrading the sugar rich but otherwise nutritionally poor plant sap and honeydew.

My project will improve our understanding of mutualisms by unravelling the metabolic and behavioural mechanisms underlying species interdependence in this specialised symbiotic network. To this end, I will (i) assess covariance between bacterial communities of associated ants and aphids, (ii) determine the functional roles of bacterial communities in honeydew composition, and (iii) assess ant behavioural specificity in choice of aphid partners. I will then (iv) further interpret my findings in a broader context by applying network theory to this focal network and other comparable mutualistic networks, thereby adding to our general understanding of the evolution and stability of mutualism.

#### Fields of science (EuroSciVoc) 1

natural sciences > biological sciences > microbiology > bacteriology

natural sciences > biological sciences > evolutionary biology

<u>natural sciences</u> > <u>biological sciences</u> > <u>biological behavioural sciences</u> > <u>ethology</u> > <u>biological interactions</u>

<u>natural sciences</u> > <u>chemical sciences</u> > <u>organic chemistry</u> > <u>amines</u>



#### Programme(s)

<u>FP7-PEOPLE - Specific programme "People" implementing the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007 to 2013)</u>

### Topic(s)

#### Call for proposal

FP7-PEOPLE-2013-IOF See other projects for this call

## **Funding Scheme**

MC-IOF - International Outgoing Fellowships (IOF)

#### Coordinator



STICHTING VU

EU contribution

€ 270 312,90

Total cost

No data

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**Higher or Secondary Education Establishments** 

Links

Contact the organisation Website Participation in EU R&I programmes HORIZON collaboration network

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**Permalink:** https://cordis.europa.eu/project/id/624145

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