



Evaluating the benefit of species-mixes of entomopathogenic nematodes

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Abstract:

Laboratory studies were conducted to determine whether combining two entomopathogenic nematode species would result in superior control effects against insect targets than the application of single species. This study aimed to achieve the following objectives (1) to find out if the applications of two different species at the same time can increase the efficacy compared to the application of a single species and (2) to examine if the difference in the efficacy of mixed and single applications might be caused by changes in the invasion of the two applied species and lastly (3) to investigate how mixed applications influence the propagation of the nematodes in the host. The exemplary studies were carried out with last larval instars of *Tenebrio molitor* and the 2nd stage larvae of *Diabrotica virgifera virgifera*. The nematodes used in the experiments were *Heterorhabditis bacteriophora*, *Steinernema feltiae*, *Steinernema carpocapsae* and *Steinernema kraussei*. In laboratory bioassays, lethal dosages that resulted in the average in 50 % mortality (LD50) were used for the single species applications in comparison to the respective LD25 of each of the two species in the mixed applications of the nematode species. In the assays with *T. molitor* the invasion of this host by the infective juveniles (IJs), the mortality of the insects and the emigration of the next generation of IJs were quantitatively assessed. In the assays with *Diabrotica* larvae only the insect mortality was assessed. Invasion of IJs for each species in the mixed applications were not significantly different from the expected numbers. However, invasion was lower in the mix than in the single species applications due to the lower dosage used in the mixtures. This had no negative effect on the efficacy against the insects and on the number of IJs which finally emerged from the cadavers. Emergence was even higher for the mixtures. The mortality of the insects was in most cases higher for the mixed applications, indicating synergistic effects. However, the efficacy of the mixtures were species specific. The efficacy of mixtures with *H. bacteriophora* were superior over mixtures of steinernematids against *Diabrotica*, but inferior against *Tenebrio*. We conclude that combining nematodes species might be more effective in the field, because of the stronger dose effect and higher propagation rate of the EPN.

Biography:

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Publication of speakers:

1. Lohse, Samuel & Burrows, Nathan & Scarabelli, Leonardo & Liz-Marzán, Luis & Murphy, Catherine. (2020). Anisotropic Noble Metal Nanocrystal Growth: The Role of Halides*. 10.1201/9780429295188-15.
2. Daly, Clyde & Allen, Caley & Rozanov, Nikita & Chong, Gene & Melby, Eric & Kuech, Thomas & Lohse, Samuel & Murphy, Catherine & Pedersen, Joel & Hernandez, Rigoberto. (2020). Surface Coating Structure and Its Interaction with Cytochrome c in EG6-Coated Nanoparticles Varies with Surface Curvature. *Langmuir*. XXXX. 10.1021/acs.langmuir.0c00681.
3. Olenick, Laura & Troiano, Julianne & Vartanian, Ariane & Melby, Eric & Mensch, Arielle & Zhang, Leili & Hong, Jiewei & Mesele, Oluwaseun & Qiu, Tian & Bozich, Jared & Lohse, Samuel & Zhang, Xi & Kuech, Thomas & Milvolte, Augusto & Gunsolus, Ian & McGeachy, Alicia & Dogangun, Merve & Li, Tianzhe & Hu, Dehong & Geiger, Franz. (2018). Lipid Corona Formation from Nanoparticle Interactions with Bilayers. *Chem*. 4. 10.1016/j.chempr.2018.09.018.
4. Kharazian, Bahar & Lohse, Samuel & Ghasemi, Forough & Raoufi, Mohammad & Saei, Amirata & Hashemi, Fatemeh & Farvadi, Fakhrossadat & Alimohammadi, Reza & Jalali, Seyed & Shokrgozar, Mohammad & Hadipour, Nasser & Ejtehad, Mohammad Reza & Mahmoudi, Mor-teza. (2018). Bare surface of gold nanoparticle induces inflammation through unfolding of plasma fibrinogen. *Scientific Reports*. 8. 12557. 10.1038/s41598-018-30915-7.

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