

Withdrawn resources: *Rickia wasmannii* shortens the lifespan of *Myrmica scabrinodis*

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Introduction Laboulbeniales is a poorly researched ectoparasitic taxonomic group of Ascomycetes. The effects of Laboulbeniales species on their hosts are rather unknown. *Rickia wasmannii* (Fig. 1) is a common Laboulbeniales fungus occurring in Europe and is currently known as parasite of at least eight *Myrmica* ant species (Fig. 2). *Rickia wasmannii* can be a good model organism, compared with other European Laboulbeniales species, as this species covers the host in very high density and infected host individuals can be easily collected in high number. The effect of *Rickia wasmannii* on the survival rate of its most common host species, *Myrmica scabrinodis*, was investigated in a laboratory experiment on individual level.

Materials and Methods Twelve colonies were collected from N-Hungary (from Rakaca six infected and from Aggtelek six uninfected colonies) and twelve others from E-Hungary (from Újléta six infected and from Csíkgát six uninfected colonies). All of these colonies contained fertilized queens and hundreds of workers, larvae and pupae. The ants were kept in artificial lab nests with complex food resources (cockroaches twice a week, honey water ad libitum). The colonies were stored in the laboratory for minimum a week as an acclimation period before testing.

In total 240 infected and 240 uninfected specimens were selected for the survival test to 24 boxes. To be able to repeat the research, separated mini-colonies were provided with Bhatkar diet (Bhatkar and Whitcomb 1970) and water ad libitum 24 hours before the beginning of the monitoring. After 24 hours, all food and water was withdrawn and we checked each mini-colonies hourly by counting the number of dead workers. A specimen was considered to be dead, when it did not move any legs or antennae after touching them by forceps. During the experiment the room temperature (23.4-24.2 °C) and humidity (35-39%) were recorded in each hour. The experiment was finished with the death of the last individual.



Fig. 2: *Rickia wasmannii* on *Myrmica scabrinodis* (photo: C. Mihali)

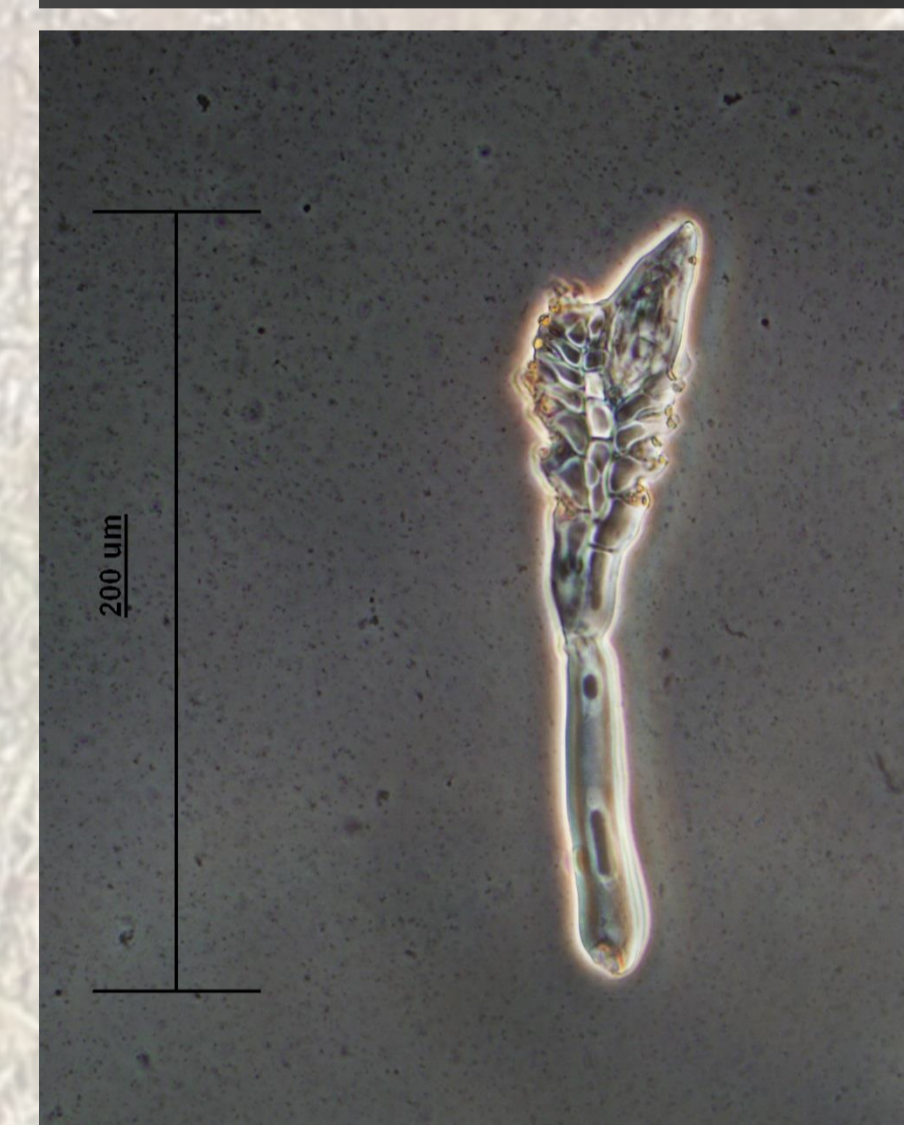


Fig. 1: Thallus of *Rickia wasmannii* (photo: Walter P. Pfliegler 2013)

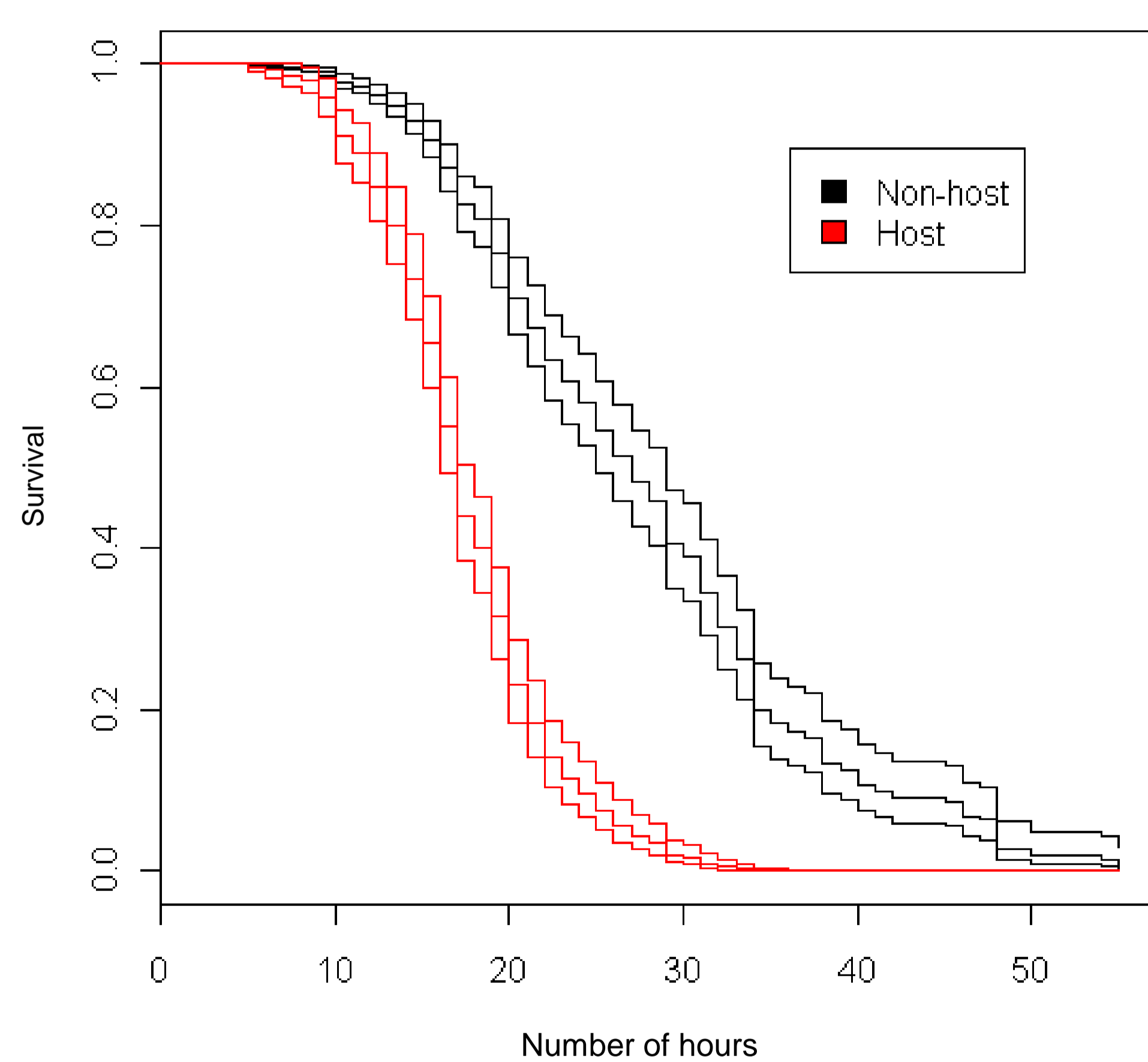


Fig. 3: Difference between lifespan of infected (Host) and uninfected (Non-host) *M. scabrinodis* workers (Uninfected vs. Infected). (Cox regression, coeff = 1.45, exp (coef) = 4.30, z = 13.58, p < 0.0001, n = 468)

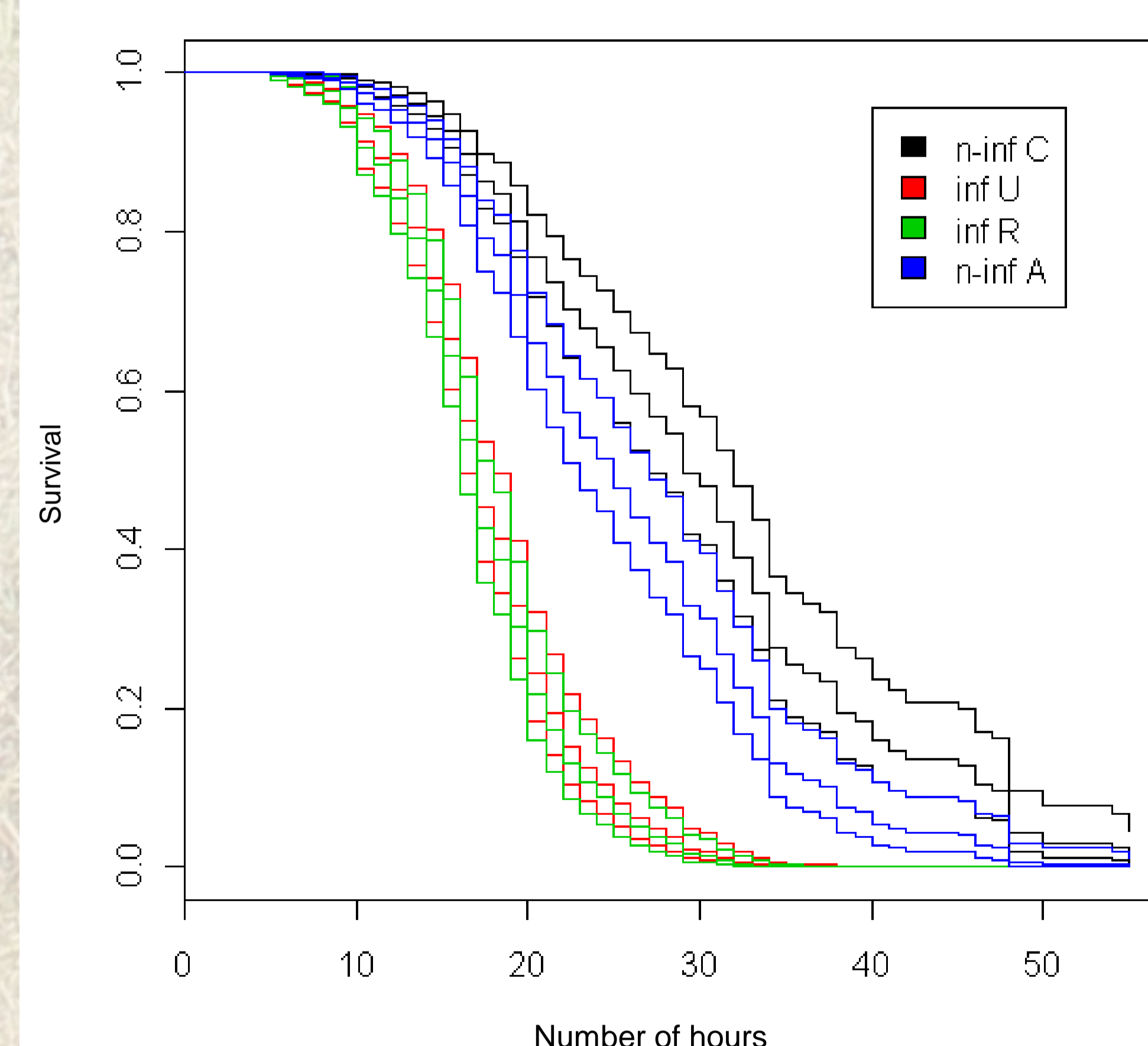


Fig. 4: Difference between lifespan of infected (inf) and uninfected (n-inf) *M. scabrinodis* workers (all site). (R: Rakaca: z = -6.63, p < 0.0001; U: Újléta: z = -4.81, p < 0.0001)

Results and Discussion When all the infected (Újléta and Rakaca) workers were analysed together v.s. all the uninfected ones (Csíkgát and Aggtelek), the lifespan of uninfected workers was significantly higher compared with infected ones (Cox regression, coeff = 1.45, exp (coef) = 4.30, z = 13.58, p < 0.0001, n = 468) (Fig. 3). When uninfected and infected workers were analysed on population level, similar results were found, as survival from the two infected populations, Rakaca and Újléta, significantly differed from the two uninfected population, Csíkgát and Aggtelek (Fig. 1: Rakaca: z = -6.63, p < 0.0001; Újléta: z = -4.81, p < 0.0001). (Fig. 4)

The results clearly prove that *Rickia wasmannii* has a negative effect on the survival of *M. scabrinodis*, at least under laboratorial conditions when water and meal are not available. It is still an open question if this negative effect of *R. wasmannii* on *M. scabrinodis* is so clearly negative under natural condition when e.g. the ants can dig down up to the wet soil in dryer periods.



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References

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