

Back to home in desert

Overview

- Paper of M. Collett
- Concept of global and local vector
- Model of the ant
- Conducted experiments
- Our simulation
- Conclusion



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Source: <https://www.antbites.net/adult-ants-fourth-stage-of-the-ant-life-cycle/>

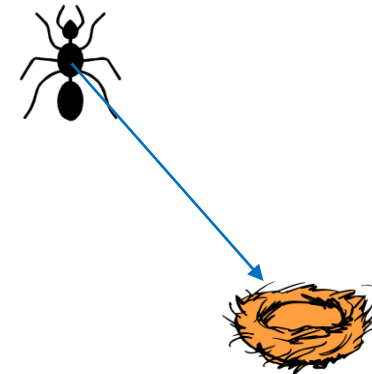
Paper of M. Collett et al.

- Written in 1998
- Local and global vectors in desert ant navigation
- M. Collett, T. S. Collett, S. Bisch, R. Wehner



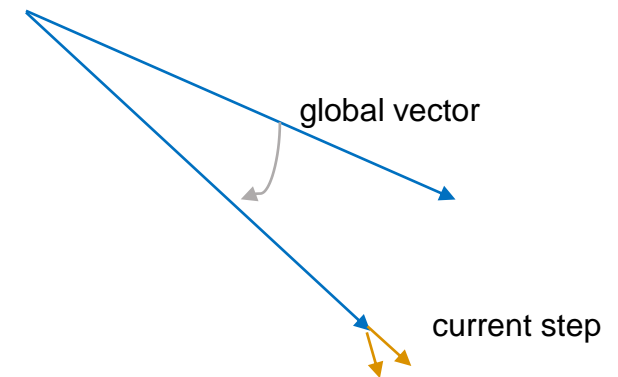
Global and local vector

- Problem: few visible landmarks in desert
- Solution: path integration => global vector
 - Sun as compass
- Landmarks => local vector
 - Relative to cardinal direction
 - Interesting, because sun is needed



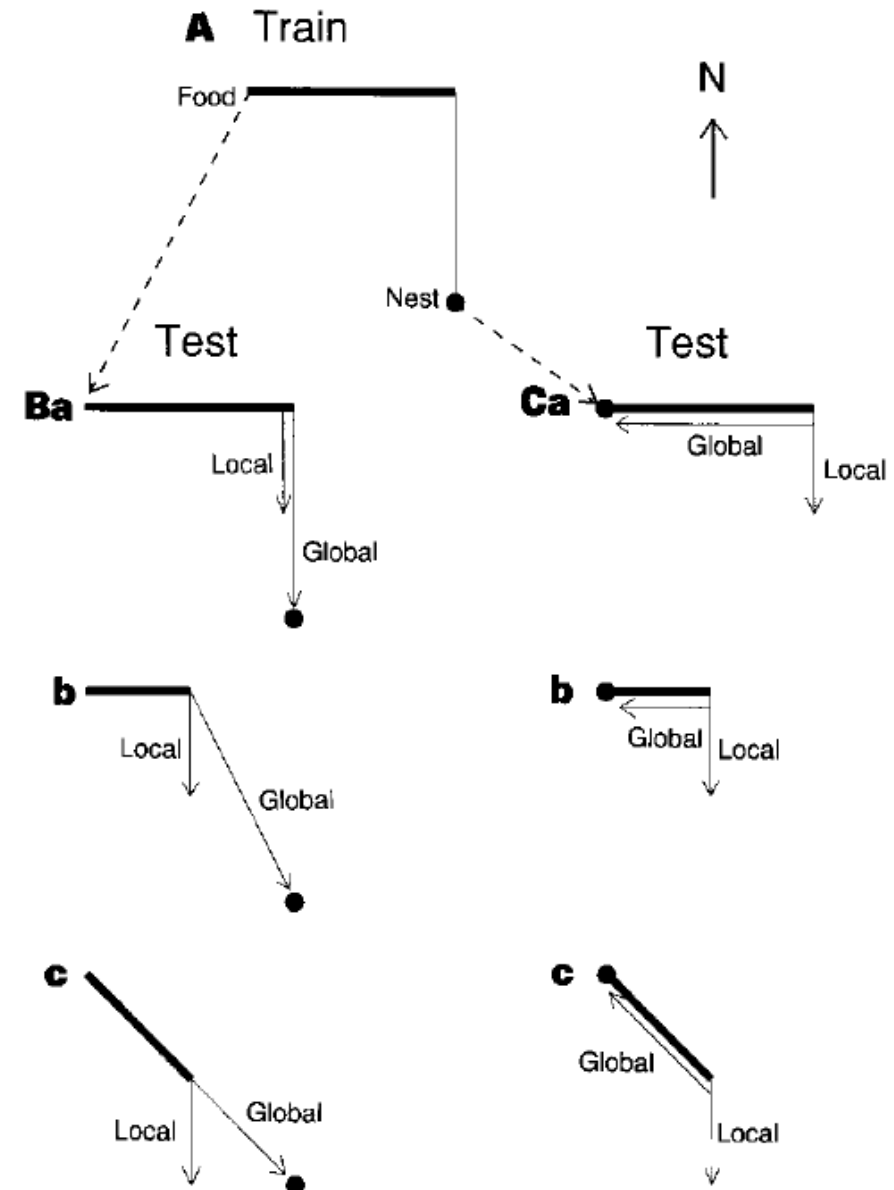
Model of the ant

- Python
- Iterative approach
- Global and local vector calculated in every step
- Global vector
 - Each step added
 - Randomization
- Local vector
 - Landmarks «pull» ants
 - The closer the stronger

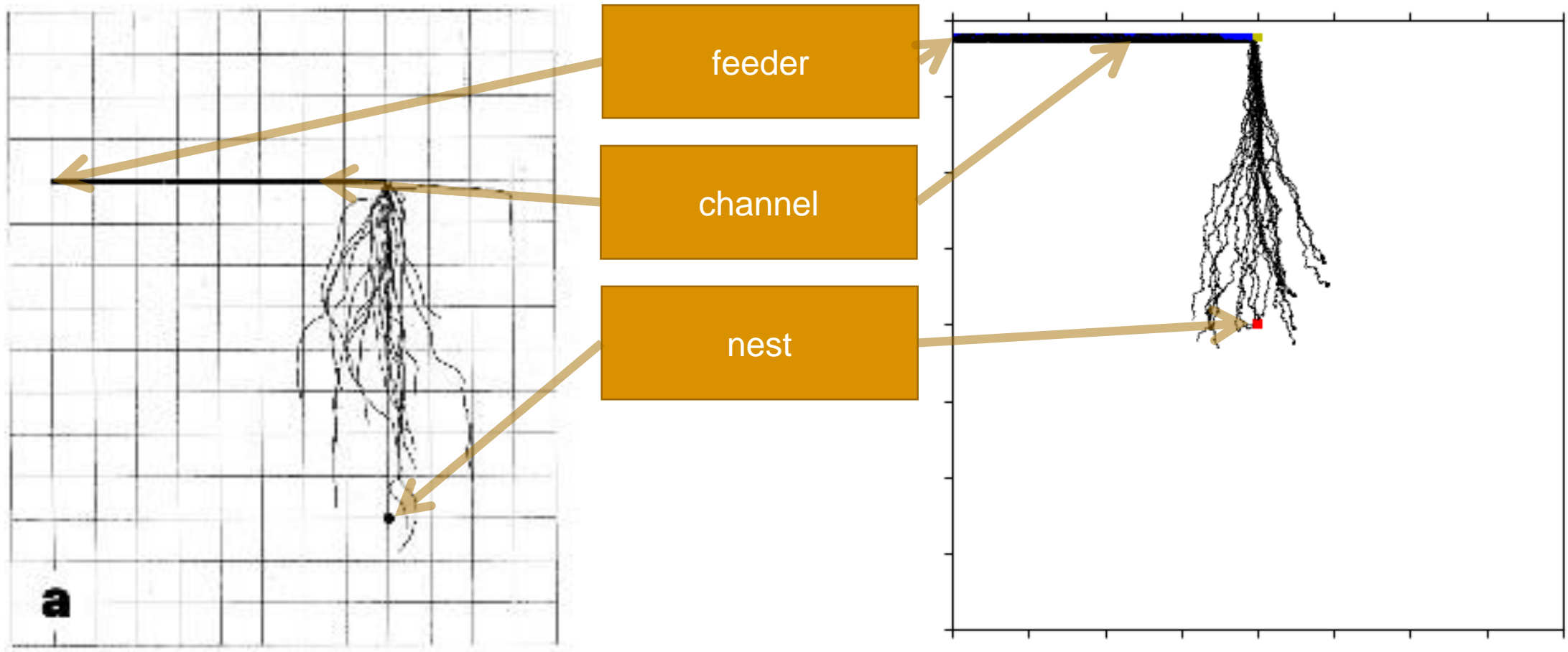


Conducted experiments by M. Collet et al.

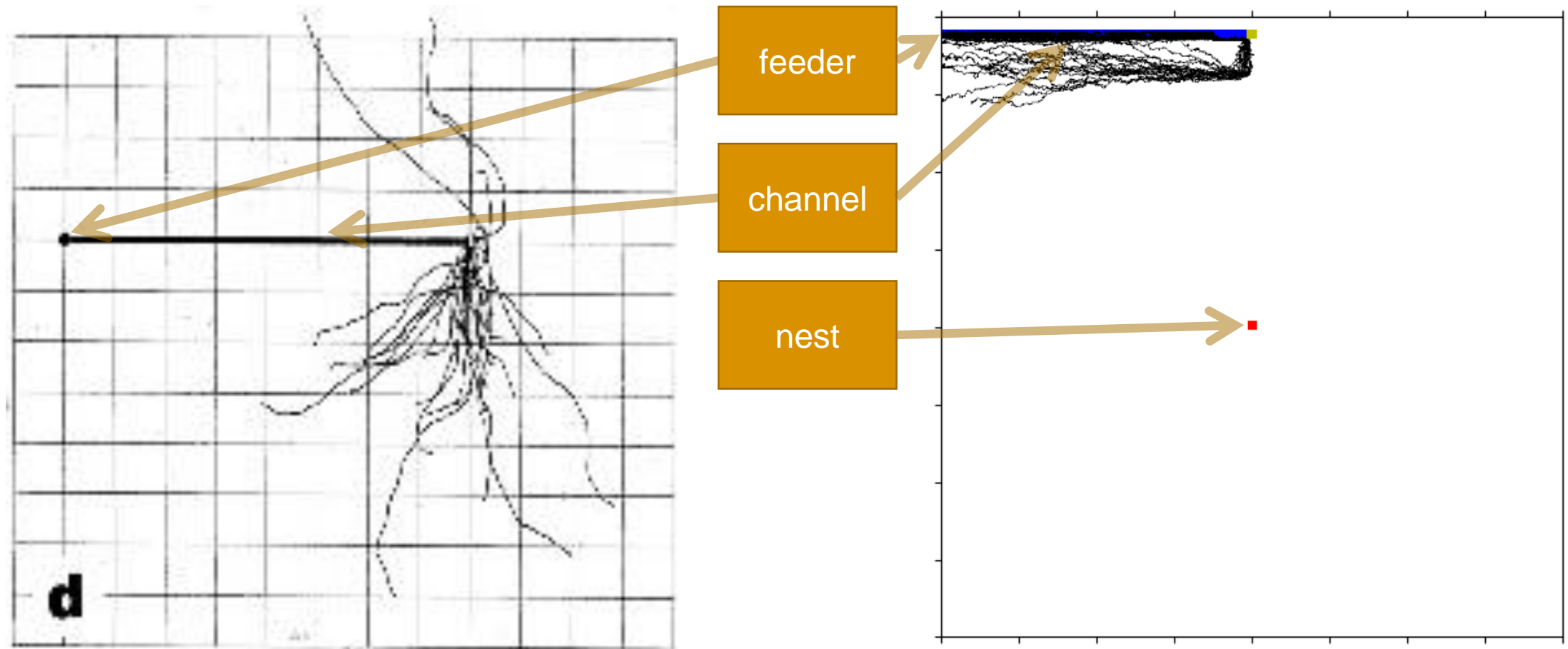
- The desert ants were trained on setup A
- They were picked up at nest or feeder
- Launching position is always the feeder
- Test B: pickup feeder – launching feeder
- Test C: pickup nest – launching feeder



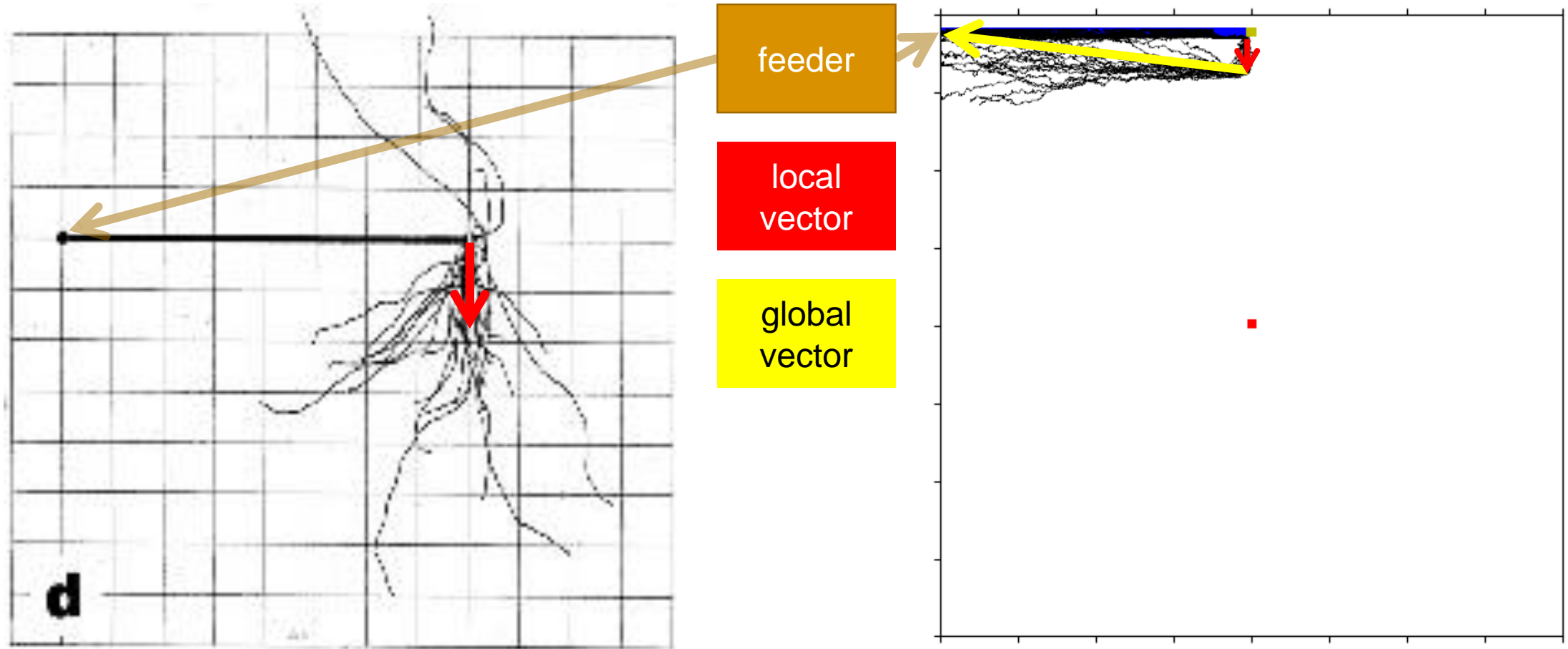
Results Test Ba



Results test Bc



Results test Ca

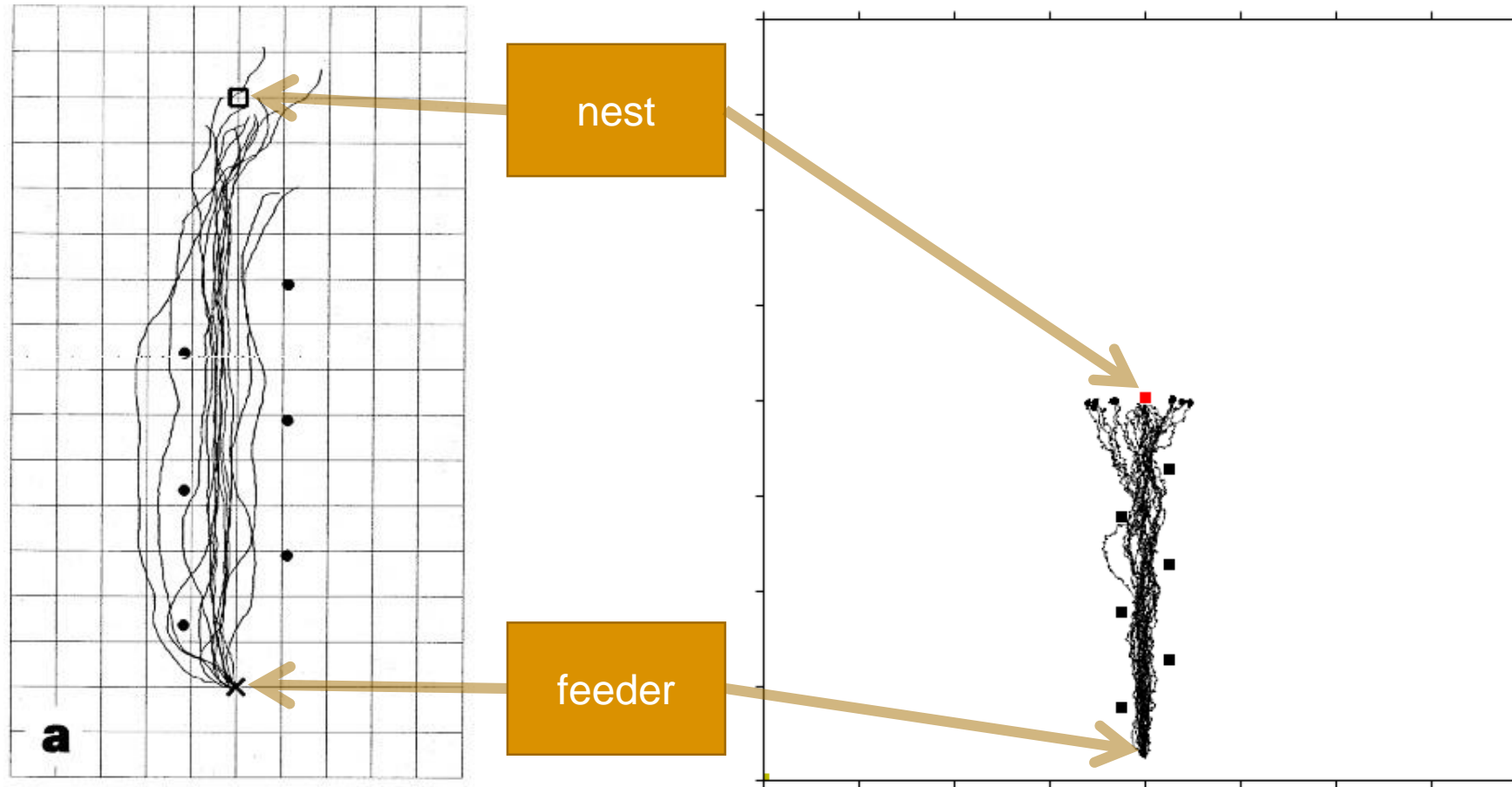


Second experiment setup

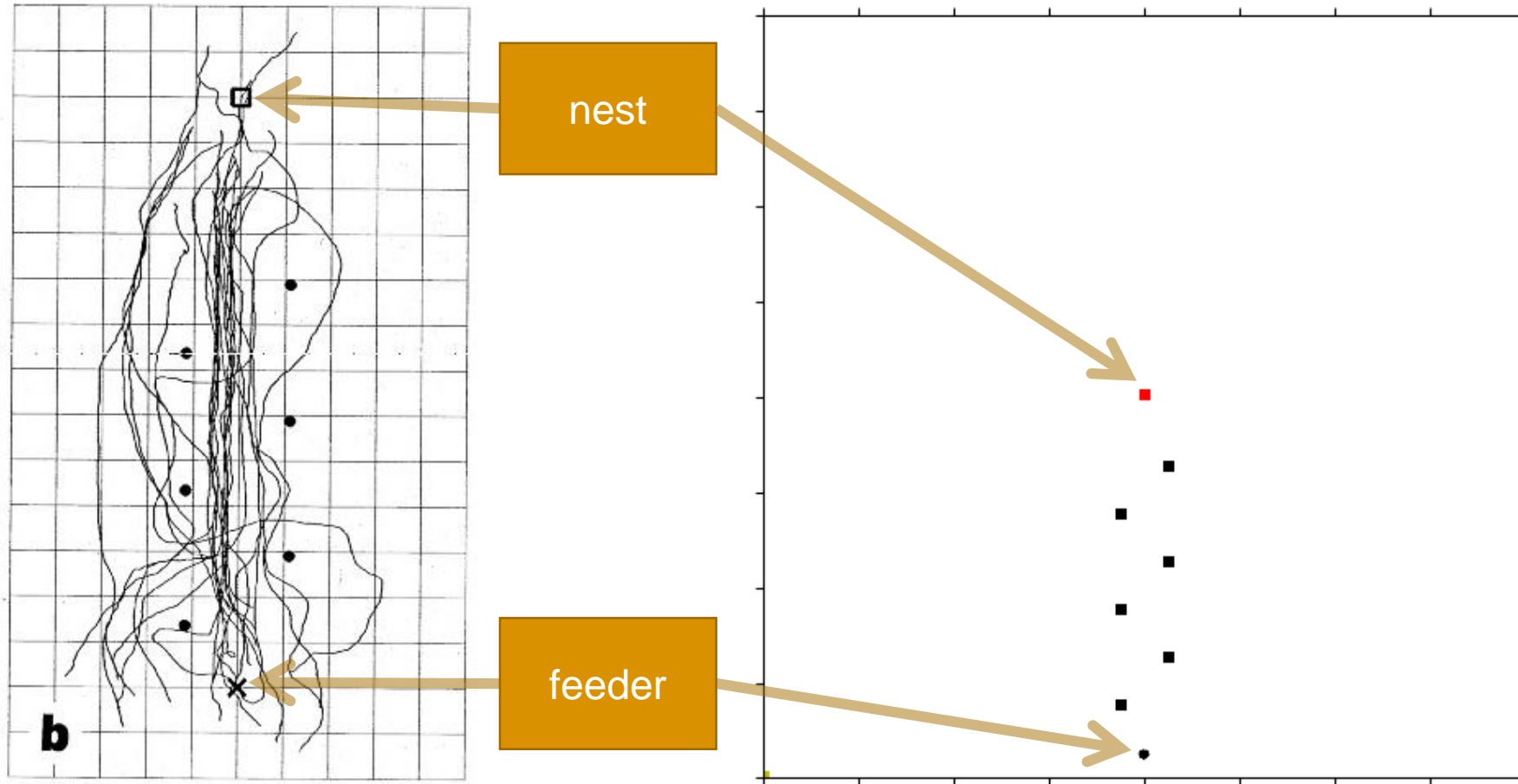
- Black cylinders as visible landmarks
- Ants training: walking from the feeder to the nest
- Test 2a: exactly the same as training
- Test 2b: pick up the ants at nest and launching at feeder



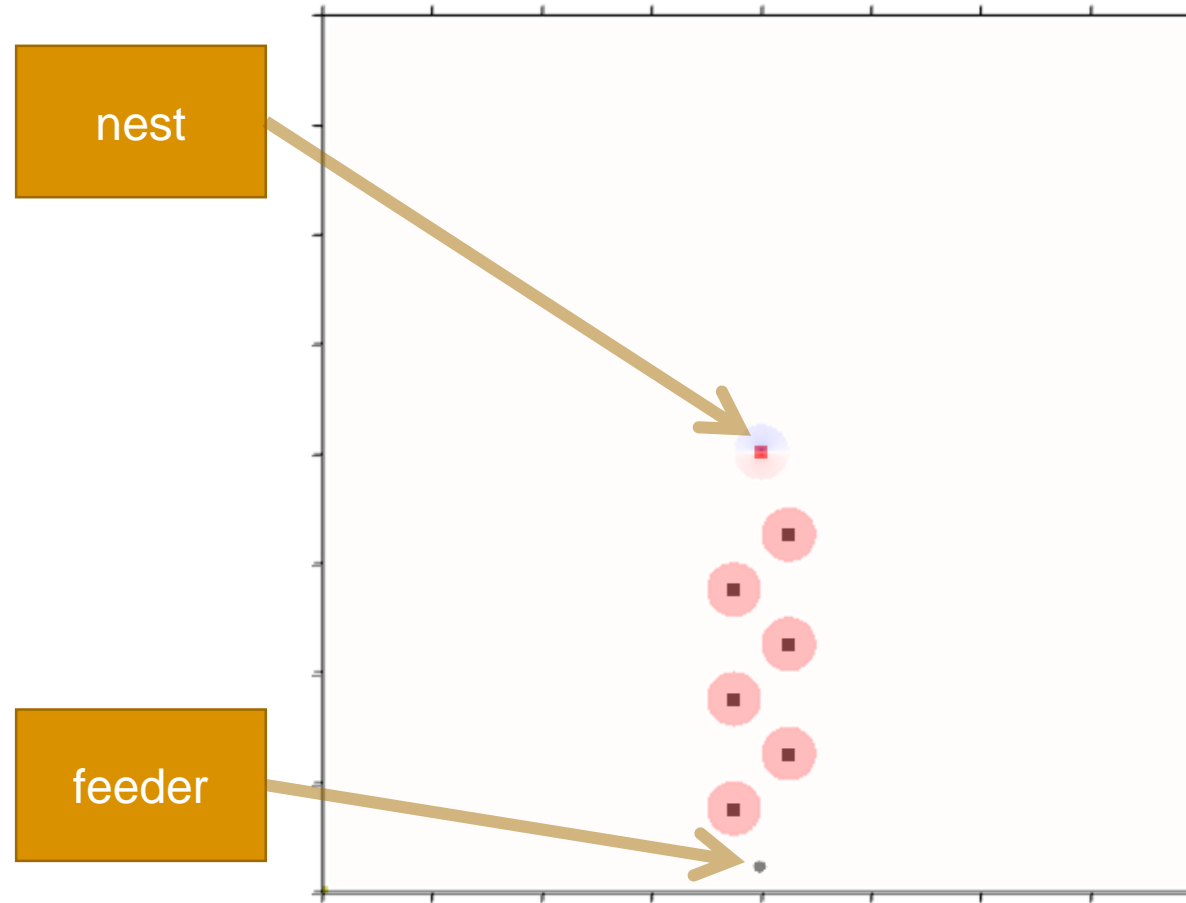
Results test 2a



Result test 2b



Only local vector



Conclusion

- Between the experiments and the simulation exist visible similarities
- Biggest difference: search walk of disoriented ants



Possible improvements

- Implementation of a search walk
- Concept for natural exceptions
- Social interactions between desert ants

