

Myrmecological News	12	40	Vienna, September 2009
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Book review

TSCHINKEL, W.R. 2006: The fire ants

Belknap Press of Harvard University Press, Cambridge, MA, 744 pp., ISBN-10: 0-674-02207-6, ISBN-13: 978-0-674-02207-2, Price: US\$ 100.00, €70.00

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Myrmecol. News 12: 40 (online 10 November 2008)
ISSN 1994-4136 (print), ISSN 1997-3500 (online)
Received 2 October 2008; accepted 6 October 2008

An organism's resource use changes over the course of its life cycle, and an ant colony is no exception. Walter Tschinkel has devoted his career to tracing this relationship in the red imported fire ant, *Solenopsis invicta*. In the process he has become a kind of advocate for the fire ant, the species that almost everyone else loves to hate. He opposed the pesticide program intended to eliminate the fire ant in the southeastern US. His opposition has been vindicated by the consequences of that spraying, which by clearing out the competition seems to have promoted, not inhibited, the fire ant's spread. But though Tschinkel may be best known for his skepticism about fears of ecological catastrophe brought on by the fire ant, probably his most important contribution to physiological ecology is the body of work that examines the relation between a colony's resource use and its growth: how it obtains food and translates that food into workers and reproductives.

The fire ants is a long but immensely readable account of Tschinkel's research on the growth and resource use of fire ant colonies. Tschinkel used a site that was recently cleared, so that he knew the time when all the colonies were founded. He developed a method for estimating colony growth by extrapolating from the number of ants, laboriously counted, in a known volume of soil. Tschinkel's work shows that once a fire ant colony moves past the founding stage, it enters into a period of rapid growth. As more workers are produced, they can get more food, which makes it possible to produce more workers. Much more

food is needed to produce an ant than to produce an egg. As Tschinkel points out, an adult fire ant female reproductive is 3500 times as large as an egg. Tschinkel describes the years of research, some in collaboration with former student Sanford Porter, that show that food probably limits not the number of eggs a queen can lay, but the number of eggs that survive to become workers.

To understand what sets the rate of colony growth in a natural population of ant colonies, we'd need to know what the ants eat and how that food fluctuates in availability, whether the colony stores food or has to use it when available, how quickly workers develop from eggs, and the system for distributing food to larvae and for adjusting the numbers of workers produced to the amount of food available. Tschinkel's work addresses these questions. The book spells out how he learned that fire ants regulate growth, in response to temperature and food supply. The more food available, the faster the colony grows. The work of Debby Cassill, formerly Tschinkel's student, shows that each time a larva is fed, it gets the same amount of food, so when there are more larvae, more workers must get involved in feeding. In this way colony growth stimulates further growth, because the more the colony grows, the more workers are available, both to get more food and to feed it to more larvae. Another one of Tschinkel's students, Eldredge Adams, examined how competition between colonies affects food supply and thus colony growth.

The fire ants is animated by Tschinkel's extraordinary focus and passion, tempered by a dry and sometimes dark sense of humor. The style is often informal, as if he were talking rather than writing, and interesting anecdotes are sprinkled in among the passages with careful technical detail. This will be the classic work on fire ants, of course, but also, more generally, on how ant colonies take in food and turn it into ants. Anyone interested in the physiology of the ant colony will enjoy and learn from this book.