COMMENTS

Comments on Rarity and Chaos, Thomas D. Rogers, *Math. Biosci.* 72:13–18 (1984)

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Rogers notes that 1. a rare population need not be chaotic, and 2. a chaotic population need not be rare. He is, of course, correct, and if anyone had gotten some other impression from any of my work [1,2], I am grateful to Professor Rogers for clearing up that point.

On the other hand, I do hope his note does not confuse a second, possibly important, point with regard to chaotic behavior in population models. It has been noted that, for some models, a general correlation will exist between the size of population flushes and length of time the population remains rare after the flush, a condition I termed "resolved chaos" [2]. That result is unaffected by Rogers' comments, and whatever possible implications there are remain as previously discussed.

I also hope that the intended message of my perhaps incautiously titled "To be rare is to be chaotic" is not obscured. That message is simply that a possible (certainly neither necessary nor sufficient) cause of rarity is a chaotic population trajectory. Some models produce chaotic patterns in which population flushes are followed by long periods of rarity. This is offered as a third qualitative alternative to the usual interpretations of rarity—a low carrying capacity or a low equilibrium density as a result of interactions with other populations.

REFERENCES

1 J. Vandermeer, To be rare is to be chaotic. *Ecology* 63:1167–1168 (1982).
2 J. Vandermeer, On the resolution of chaos in population models. *Theor. Popul. Biol.* 22:17–27 (1982).

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