

corresponding social norms. Experimental studies<sup>7</sup> in indirect reciprocity have shown that gossip can indeed serve as a surrogate for direct observation. But it will take further empirical research to find out whether gossip is efficient enough to re-establish both CD and CP.

The next question addressed by Ohtsuki *et al.* was which kind of society someone might prefer to live in. To this end, they simulated one society with CD under stern-judging and another with CP under shunning. When individuals can choose freely between them, the CD society — that with the higher expected pay-off — is preferred. Thus, the CP rule loses to CD when people can choose between societies with different norms.

This last result can be compared with our own experimental work with human subjects<sup>8</sup>. We found that when individuals had the choice between a CD-only society and one with both CD and CP, they ultimately preferred the latter. Compared with a CP-only control, punishing acts were largely reduced in the CD plus CP society but were concentrated on the most uncooperative players, rendering

them more cooperative. Our experimental societies in which CD and CP coexisted were more efficient than those with only CP, suggesting that they have a more complex action rule: respond to good with cooperate, to bad with defect, and to very bad with punish. Such a possibility sets a challenge for theorists.

Finally, given that Ohtsuki *et al.* show that the social norm of a society determines which action will prevail, another task is to uncover the social norms of real societies and analyse which action rule to expect. Ohtsuki *et al.* assume that all social norms are equally likely. However, the more information a norm requires in order to develop, the more susceptible it is to errors and the more costly is the information acquisition<sup>9</sup>. Such restrictions may challenge any social norm that otherwise dominates: for example, in an experimental study<sup>10</sup>, the subjects had a majority social norm similar to shunning that was 'low observation' and 'memory demanding'.

Ultimately, study of the joint evolution of social norms and action rules under natural constraints is the goal for the future.

Ohtsuki *et al.* have prepared the ground for that endeavour. ■

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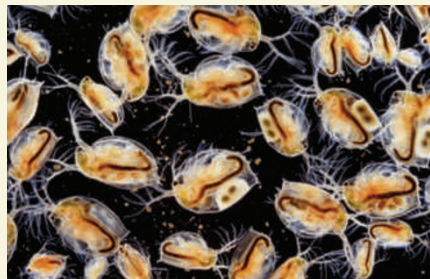
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## DARWIN 200

# A natural selection



As Charles Darwin showed so convincingly, the fauna of islands provide excellent subjects for investigating evolution. The creature on the left, *Anolis sagrei*, is a case in point. Jonathan Losos and colleagues studied this lizard in experimental work, carried out in 2003, that involved the introduction of a predator of this species onto six islands in the Bahamas. Six other islands acted as controls. Losos and colleagues' aim was



to test the hypothesis that, when organisms experience new environments, behavioural change prevents the operation of natural selection (they concluded that in this case it did not).

Readers can find out for themselves what the authors did at [www.nature.com/evolutiongems](http://www.nature.com/evolutiongems). The paper concerned is one of "Fifteen evolutionary gems: A resource for those wishing to spread awareness of evolution by natural

selection", which from today will be available as a collection on the *Nature* website. The "gems" are all papers, published in *Nature* over the past decade or so, that demonstrate the enduring explanatory power of Darwinian natural selection.

Examples are drawn from the fossil record, from extant organisms in natural and experimental habitats, and from molecular studies. The other images here — of (clockwise from top left) water fleas, *Daphnia*

*magna*; fledglings of the great tit, *Parus major*; sticklebacks, *Gasterosteus aculeatus*; and a garter snake of the species *Thamnophis sirtalis* — provide a taster of the subjects of other papers in the collection.

The papers are free to download and disseminate, and each is accompanied by a brief editorial introduction to its context and significance. ■

**See also Editorial, page 8.**