Editorial

Lesser models

A rough pecking order can be discerned among the model systems of biology if one tots up the number of articles flagged by different search terms in PubMed. I did this one afternoon and obtained: human (13,106,989); *Homo sapiens* (12,748,442); mouse (1,246,772); *Mus musculus* (1,183,744); *E. coli* (317,705); *Saccharomyces cerevisiae* (100,703); Arabidopsis (43,039); *Arabidopsis thaliana* (43,039); *Drosophila melanogaster* (40,122); Aspergillus (34,841); *Zea mays* (22,494); *Caenorhabditis elegans* (19,962); *Schizosaccharomyces pombe* (10,133); *B. subtilis* (9447); Neurospora (8166); *Dictyostelium discoideum* (7585); *Neurospora crassa* (6580); *Aspergillus nidulans* (4313); *Podospora anserina* (612); *Neurospora tetrasperma* (88); *Astyanax mexicanus* (84); *Ascobolus immersus* (75); *Raphus culcullatus* (5); *Dictyostelium caveatum* (4); and Ordovician bivalves (4). Besides allowing one to pinpoint the date that afternoon, the numbers also signal my inordinate fondness for the 'sub-100s'.

In graduate school (State University of New York, Stony Brook) my first laboratory rotation (1978) was under the supervision of Perihan Şadoğlu. Peri studied *Astyanax mexicanus*, a freshwater fish inhabiting the rivers and caves of Northeastern Mexico. Cave populations have no use for eyes and pigmentation and, consequently, are eyeless and albino; whereas surface populations have eyes and are pigmented. The two populations can interbreed, and mutations underlying eye degeneration and albinism in the troglodytes segregate in the progeny. Peri was among the first scientists to study such mutations (*Experientia* **13** 394, 1957; *J. Hered.* **60** 10–14, 1969); for recent work by others, see *PLoS One* **8** e57281, 2013.

Ascobolus immersus is an ascomycetes fungus in which any gene can potentially be reversibly silenced by a homology-dependent DNA methylation process called MIP, discovered by Jean-Luc Rossignol, Godeleine Faugeron and colleagues. Vincent Colot, then in Rossignol's group, taught me how to perform Ascobolus crosses and to tease apart the progeny ascospores from the mucilaginous goo in which they are shed from the fruiting body. Reciprocating, we taught Anne Grégoire to use *N. tetrasperma*. Self-crosses in *N. tetrasperma* can automatically become homozygous for unknown mutations via second-division segregation (*Genetics* **167** 1155–1164, 2004), whereas it is virtually impossible to make a cross homozygous for an unknown mutation in *N. crassa*. Thus, *N. tetrasperma* is the better model, a *C. elegans* of Neurospora if you will, to screen for recessive mutations affecting the diplophase. Aptly reflecting Sidney Brenner's influence on my PhD advisor and his Ph.D. student, Eugene Katz.

Dictyostelium caveatum and *D. discoideum* are soil amoebae that feed on soil bacteria. Additionally, *D. caveatum* amoebae can also feed on *D. discoideum* amoebae. Sterol mutants of *D. caveatum* are potentially isolatable by selection for nystatin-resistance. We wanted to test whether the mutations would be complemented if they were fed wild-type *D. discoideum*. Disappointingly, the nystatin-resistant *D. caveatum* mutants did not show any sterol change. We published this work in *Journal of Genetics* (**17** 37–40, 1998), which at the time was 'off-PubMed'. This allowed the dodo (*Raphus culcullatus*), extinct since 1681, to peck ahead of the carnivorous amoeba. But to give the dead dodo its due, it inspired Stanley Temple's hypothesis for why *Calvaria major*, an endemic tree of Mauritius, also is heading to extinction (*Science* **197** 885–886, 1977). The thick endocarp of *Calvaria* seeds causes dormancy that is overcome only when the seeds pass through a dodo's digestive tract. Abrasion in the gizzard reduces their thickness, and enables the germinating embryo to break through. To test this hypothesis, Temple force-fed *Calvaria* seeds to turkeys. Of ten seeds regurgitated or passed in the feces, three germinated when planted subsequently in the nursery. Temple speculated that they were probably the first *Calvaria* seeds to germinate in over 300 years.

It was on a camping trip in the Delaware Water Gap that I sighted the rock with its fossil imprint (supplementary figure), possibly of an Ordovician bivalve, magnified and made plainly visible by the cascading waters of the Dingmans Falls. That yours truly had found a fossil bivalve proved that 'time and chance happeneth to them all'.

DURGADAS P KASBEKAR
Editor

Published online: 27 January 2014