



Scarlet rosefinch

## Molecular Ecology in Prague

# Pavel, Pavel and Pavel

“We think that colouration can influence success in extra-pair paternities,” bird expert Pavel Munclinger concludes from one of his studies. Another line of research, however, is about the emergence of species – in mice.

It is June. The lovely landscape of the Sumava Mountains National Park in the Czech Republic extends into the horizon. The Vltava river bubbles and the mosquitoes are ravenous for blood.

If you are a dedicated ornithologist, however, you don't mind the mosquitoes. Pavel Munclinger and his colleagues definitely are. Every year from the end of May until late July they leave their labs in the middle of busy central Prague to live in a little cottage without electricity and without running water for one purpose: to stalk little birds known as scarlet rosefinches (*Carpodacus erythrinus*).

### No rewards for cheating

The Munclinger team is part of the so-called BRG (Biodiversity Research Group) that belongs to the Department of Zoology in Prague's Charles University. As part of a project by the Czech government to encourage people to stay in academic research, the BRG founding members received quite a bit of money to set up their lab back in 1998. From the beginning they were a bunch of small independent groups with strong ties to two institutes of the Academy of Sciences of the Czech Republic (ASCR), a public non-university scientific institution for basic research. That is why some of the group's researchers are more involved in the BRG, others more in the ASCR Institute of Vertebrate Biology or the Institute of Animal Physiology and Genetics. The former BRG leader Jan Zima, for instance, is now the head of the Institute of Vertebrate Biology. Today, Pavel Munclinger is the official BRG head but the group's core members include two other Pavels: Pavel Stopka and Pavel Němec.

“We just try to answer very simple questions from ecology,” Munclinger says modestly. Němec's group is mainly interested in the magnetic orientation of mammals. Their most important result so far has been the discovery of the parts of a mole rat's brain that are responsible for magnetic orientation (*Science* 294: 366-8). Stopka, his

wife and their co-workers, try to understand the role of urinary proteins in communication between mice and Munclinger approaches the ecological questions from a molecular point of view most of the time.

One of his research topics is reproductive strategies in birds. A new project, for example, deals with ducks that commit egg dumping – meaning they lay eggs not only in their own but also in their neighbour's nest. He is still reluctant to speak about that because the results have not yet been published. When it comes to his other bird project, however, he goes into raptures and here we are – back with the scarlet rosefinches. Put simply, their rosefinch projects are all about finding your dream man, faithfulness and infidelity.

Munclinger, together with Tomas Albrecht and other members of their team, can show that within the rosefinch population they are studying in the Vltava riv-

er valley, grown up males are brightly coloured. However, there is a lot of diversity: Their colour shade can vary from yellow to red. “We think the colouration can influence the success in extra-pair paternities,” explains Munclinger, “Carotenoids are responsible for the colouration which means that it is an honest signal,” because the birds get their colour from food. Therefore, only those who are fit during winter or who are not ill, for instance, will be beautifully red and this probably renders them attractive to females.

### Some finches are lame ducks

However, there are other finch species whose females are a lot more “emancipated”. For example, the closely-related house finch (*Carpodacus mexicanus*) that lives in Northern America. Whereas the scarlet rosefinch females – once they have chosen a companion – stay with their mate, the house finch females are more flighty in the true sense of the word. During breeding, finch females stay in the nest and the male provides food. It seems that if the house finch male is not very successful in feeding the female, the female will desert the nest and start to

find another male as a social partner.

This is only possible, however, because house finch populations do not migrate and have an extraordinarily long breeding period. The scarlet rosefinch on the other hand migrates long distances and starts breeding very late. Therefore, the female probably needs to take the first available male as a companion but if he turns out to be a lame duck she will not have enough time to leave him and start all over again. The only other alternative in order to produce offspring with a better male – meaning fitter (and probably redder) – is cheating.

For their rosefinch studies, Munclinger and colleagues annually try to find every mating pair of their population. They will inspect every bush and once the nests are identified they will check them regularly. For example, they record the frequency of



Spot the three Pavels

er valley, there is no trade-off between the extra-pair and within-pair success of males (*Behavioral Ecology* 18: 477-86). That means that females who are cheated on by their male companion do not pay their mates back with a tit-for-tat affair – they stay faithful. Scientifically speaking, males who are good at extra-pair paternities are also good at within-pair paternities. At first glance, this seems astonishing because when a male is looking around for other females it has less time to look after its own mate. You could therefore predict that the female mate may be tempted to copulate with another male in the meantime.

### The fitter the redder

So why is it that some males just seem better at reproducing? Whereas the plumage of both the female and the young male

*by Leonid Schneider*

*These transgenic mice  
unfortunately have a  
lethal phenotype...*