

## The Robert gene

SHEILA SOWTER

When I took some rats to the pet shop there were three unusual rats already there. They were grey with white headspots, white bellies and a mixture of white and dark grey hairs on the sides with a gradation from mostly white at the bottom to extremely dark grey along the spine. I knew if I left them I would wish I hadn't and would wonder about them but they were all bucks, so I was firm with myself and took only one. This was Robert.

I took him to a couple of shows, passed him round and asked what he was and what colour he was (his dark grey didn't look like any colour I knew). The most accurate answer I got was 'I don't know'. He seemed to have possibilities as father of variegateds or, if the speckled sides could be bred out, for Berkshires. Arrangements to send him to a breeder of variegateds fell through and time was passing. He needed a chance to pass on his genes. I had a stroke of luck. Still thinking he might be a Berkshire, I selected Diaphenia, a mink Berkshire bride for him. Robert was eager and Diaphenia produced eight kittens, two black selfs, two Roberts and four 'baldies' which were white except for grey on the head with white noses, a triangular white patch where a human might have a bald patch and a white line joining this patch to the white on the back.

I thought that Robert's pattern might be due to a gene (*Ro*) possibly on the hooded locus, and dominant, since two of his kittens were like him and there was nothing similar in Diaphenia's ancestry. He must be heterozygous if *Ro* was dominant since two of his kittens were ordinary selfs. On the hooded locus, *HH* gives self, *Hh* gives Berkshire and *hh* hooded. Diaphenia was, as a Berkshire, *Hh*, and if Robert was *RoH*, *HH* would be the selfs, *RoH* the Roberts of the litter and *Roh* must be the baldies. Unfortunately, three of the baldies and one of the young Roberts were male, so Robert was given a champagne self second wife and produced, as expected, Roberts and selfs, which were black and champagne and included three Robert-type does.

I then had another stroke of luck. Soon after the *Pro-Rat-a* with John Wells' article

came out (*Pro-Rat-a* 97, pages 5 to 7) I was at Walton Hall and went into the Open University library to look up the Gumbreck and others (1972) reference. There were pictures, a shy looking Robert shown as an example of the *H<sup>re</sup>H* and two baldies, one (*H<sup>re</sup>H<sup>i</sup>*) with colour extending further behind the head than mine and one (*H<sup>re</sup>h*) with slightly less colour.

The authors reported that the *H<sup>re</sup>* gene had appeared in a single mutant female born on 26 October 1962 in their Oklahoma laboratory colony. The first five generations produced no fertile males (the gene, which was dominant, was passed on via the females) but by the eighteenth generation there were males fertile up to three months. They also reported heterochromia iridis (eyes of more than one colour, in this case, one dark, one light) but when I had my third stroke of luck (someone who came to me for rats turned out to be a university librarian who could track down rarer journals) I found that the heterochromia appeared to be associated with the ruby eyed gene (Macy and others 1972) which is not present in my stock. I no longer felt the need to gaze deeply into my Roberts' and baldies' eyes.

I found another paper by Gumbreck and others (1971) with more pictures. The baldies (*H<sup>re</sup>h<sup>i</sup>* and *H<sup>re</sup>h*) had a continuous white stripe on the head, nose to back, unlike my first baldies but like some of the later ones. The *HH* and *H<sup>re</sup>H* pair in the paper were dark gingerish and might have been agoutis. This paper gave statistical evidence that *H<sup>re</sup>* is allelic to other genes on the hooded locus, that it is not sex linked and that *H<sup>re</sup>H<sup>re</sup>* are not produced. (Other papers report that any *H<sup>re</sup>H<sup>re</sup>* born alive die within an hour.)

I believe at present that the Robert gene is *H<sup>re</sup>* and matings so far do not disprove this. He is still capable of fatherhood at over a year, but fertile males were used in the statistical study (Gumbreck and others 1971) and if the infertility was only linked to the *H<sup>re</sup>* gene, not caused by it, it could by now, some twenty five years later, have been bred out.

None of the papers mention the paling of black to dark grey, but they might have considered it too trivial to report.

Robert has fathered black selfs and Berk-

shires. One of his Robert-type sons with a mink hooded (*hhmm*) produced a black Berkshire and a pale washed out baldy. This suggests that the son is *H<sup>re</sup>H*, *Mm* and the grandson baldy is *H<sup>re</sup>h*, *mm*. Two baldies from the Robert - Diaphenia litter gave a black hooded, a mink hooded, seven grey baldies (assumed to be black with *H<sup>re</sup>h*), four pale brownish grey baldies (assumed to be mink with *H<sup>re</sup>h*) and no Roberts. Champagne Roberts are also paler than their self littermates. Work with other colours is proceeding. Robert himself sacrificed a bit of fur from his side which under a powerful lens seemed to have short pale grey hairs and longer hairs, pale at the base, dark at the tip.

Now my eye is in, I'm seeing quite a lot of Roberts. If the 'Roberting' is very poor, they are shown as Berkshires with a lovely headspot and poor demarcation. Those with extensive 'Roberting' are shown as variegated. Others turn up in the pet class. All enquiries about their origin lead back to pet shops.

For the pure fancier, there seems to be the potential for developing two new varieties of marked rats, Roberts and baldies, while for the latter with an interest in genetics there are many fascinating questions. Hélène Prendville already has two litters sired by Robert, a baldy and a Robert have gone north and a baldy has gone to Belgium. Work continues.

### References

- GUMBRECK, L.G., STANLEY, A.J., ALLISON, J.S. & EASLEY, R.B. (1972) Restriction of colour in the rat associated with sterility in the male and heterochromia in both sexes. *Journal of Experimental Zoology* **180**, 333-349  
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 MACY, R.M., STANLEY, A.J. & GUMBRECK, L.G. (1972) Genetic factors involved in heterochromia in the Norway rat. *Journal of Heredity* **63**, 189-190

### Ann Storey, the NFRS Standards Officer, comments

Robert certainly seems to have a dominant white spotting gene and probably an allele at *H*. His spotting seems to be similar to the white spotting that you get with chinchillas

and *H<sup>re</sup>*. As I mentioned before (*Pro-Rat-a* 97, page 9) colour paling including heterochromia (in America and Holland you get blazed rats with one black and one pink eye) is common with mutations at *H*. I think, however, that it is unlikely that either type of dominant white spotting is *H<sup>re</sup>* because of the fertility of the bucks and the colour paling. (The chinchilla pattern is rather like it in that it is a lethal but it is the does that become infertile and not the bucks.) The Roberts are just as likely to be due to a new mutation. However, this is impossible to prove as stock of *H<sup>re</sup>* probably no longer exist. The *H* gene in rats appears to produce very high numbers of mutations.

## The ups and downs of free range rat keeping

EMMALENE NEATH

I joined the NFRS two years ago after reading about Nicky Chandler's rats in the newspaper. Until then I never realised there was a society for rat lovers. It has been a family tradition to name our animals after alcohol. I don't know why or how it started (we are not a family of alcoholics) but hence my rats: Whiskey, Brandy, Shandy, Tia Maria, Baileys, Martini, Guinness, Chardonnay, Stout, J.D., Bollinger and Stolichnaya. They are all free range rats. I especially like articles on free range rat keeping in *Pro-Rat-a* as it is nice to know that I am not the only mad (so my friends think) rat lover around.

I cleared out my spare bedroom a couple of years ago and filled it with boxes and tubes. Boxes are available everywhere although it's best to avoid any with staples in. For tubes, find your nearest building site and pester builders for spare cable pipes and drain pipes and ensure they are well cleaned. I placed my rats and their cages in the room, on a sideboard which is handy for keeping all their stuff in and keeps the cages off the floor, avoiding draughts. Make sure that the rats can easily get up and down to their cages at all times. I use a large tube because old rats find it hard to jump up to their cages.

My rats are now free range twenty four hours a day after I supervised them for a