

# Pink eyed dilution and Red eyed dilution

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## Origin

### PINK EYED DILUTION



Champagne Berkshire doe  
(a/a p/p)

NFRS named it “argente” but the name was changed to “silver fawn” soon after. In the USA this variety is also known as “amber” (Mays, 1997). AFRMA has both amber and silver fawn in their standards, amber rats being described as a “light golden fawn colour, evenly interspersed with light hairs” and silver fawn as “a rich orange fawn, evenly ticked with silver guard hairs” (AFRMA Fancy rats - AOC & AFRMA Fancy rats - Silvered). Lighter rats are basically known as amber and darker shaded ones as silver fawn. Most other clubs do not make this distinction between the different shades of this colour.

Champagne and silver fawn (aka: Amber) are caused by a gene called pink eyed dilution. Pink eyed dilution was described by Castle in 1914 (Robinson, 1965).

The colour champagne was known as “cream” in 1935 UK standards. When the standards were taken over by the NFRS in 1976 the colour officially became champagne (Mays, 1997).

Silver fawn (aka: Amber) was originally bred as “fawn” in 1910 in the UK. In 1932 the variety was named “silver fawn”. In 1976 the

### RED EYED DILUTION



Beige Self buck  
(a/a r/r)

in their standards (AFRMA Fancy rats - Self & AFRMA Fancy rats - AOC).

Red eyed dilution was described by Castle in 1914 and 1919 and by King in 1923. Red eyed dilution was found in laboratory stock in the Wistar institute (Robinson, 1965). Beige and fawn rats were first imported into the UK from Sweden (via the USA) in the late 1980’s by Nick and Marianne Mays. Beige was originally standardized as “buff” and fawn as “topaz” by the NFRS (Mays, 1997). Today in the UK, the two colours are still called buff and topaz by the NFRS (NFRS varieties of the fancy rat - Self & NFRS varieties of the fancy rat - AOV). In the USA, AFRMA names the same varieties beige and fawn

## AUSTRALIAN RED EYED DILUTION



Buff Hooded buck  
(A/-p(d)/p)

Another type of red eyed dilution appeared in Australia. The agouti version is called Fawn and the non-agouti version Buff (NSW Standards). The mutation is unique as it occurred in the isolated Australian rat population which do not have the same red eyed dilution as the rest of the world. Australians cannot import other varieties as their laws forbid it. Australian red eyed dilution has not been scientifically described yet.

## South African History

### PINK EYED DILUTION

The origin of this mutation is not clear, but reports date back from sightings in the 50's to the 60's. It is speculated that this mutation could originally be from laboratory origin, later being introduced to the pet trade. Yet, there is no prove it this is in fact true or not.

### RED EYED DILUTION

Red eye dilution was introduced with the 2006 import. The gene was carried in the MS Wolf x MS Raven cross. MS Wolf x MS Raven did produce beige and fawn offspring. Today red eye dilution is very rare in South African rat populations. There is some confusion as to the pink eyed dilution (silver fawn or amber) found in our petshops, some call it fawn which can be misleading in that the mutation can be mistaken for red eyed dilution.

### AUSTRALIAN RED EYED DILUTION

Australian red eyed dilution was introduced in the 2006 import, but became extinct due to fertility problems on the line. Australian red eyed dilution was carried on the downunder line. MS Teddy was an Australian red eyed dilute (buff), but he was infertile. MS Loki carried the gene.

## Description

### PINK EYED DILUTION

#### CHAMPAGNE



Champagne Self kitten  
(a/a p/p)



Champagne Self doe  
(a/a p/p)

"Colour is a pale creamy beige. Belly colour to match top. Eye colour is red." – S.A.R.F.C. Standards

A good show quality champagne is a beautiful intense colour. Champagnes that are not selectively bred for show quality can be very pale in colour, sometimes so pale that they are mistaken for dirty pink eyed whites. Champagne rats have the same coloured eyes that pink eyed whites have. To breed champagne for show one must select the darkest champagnes. Chocolate can also be introduced into a champagne line to further improve the colour. Champagne rats that are also chocolate (a/a b/b p/p) are usually a very nice shade.

#### AMBER AND SILVER FAWN

“A rich golden fawn colour, evenly ticked with silver guard hairs. Undercoat creamy-white. Belly fur is an off-white colour. Eye colour is red.” – S.A.R.F.C. Standards



Amber Self doe  
(A/- p/p)



Amber Berkshire kitten  
(A/- p/p)

Amber and silver fawn are basically the same colour. In the S.A.R.F.C. Standards the naming amber is deliberately used to avoid confusion with a separate variety called fawn. In the USA a rat is called amber when selected for a more orange coat and silvered fawn when selected for more silver guard hairs in the coat. Amber rats have the same coloured eyes as pink eyed whites. A show quality amber is indeed a beautiful rat with a bright orange-yellow coat with the matching red eyes. As with champagne, amber rats that are not selectively bred for show quality can be rather washed out and pale in colour. Baby amber rats are also very pale in colour, only later developing the richness of colour associated with adults. When breeding amber for show quality select the darkest coloured rats with even silvering throughout the coat.

#### RED EYED DILUTION

##### BEIGE

“A creamy buff colour. Belly colour to match top. Eye colour is very dark ruby.” – S.A.R.F.C. Standards



Beige Self buck  
(a/a r/r)

Beige rats are much darker than champagne rats. The key feature of beige is the dark eye colour. Beige rats have very dark eyes that superficially appear almost black, but in good light one can see the ruby colour. Champagne is also a more softer colour when compared to beige. Beige rats should be selected for a creamier-buff (yellowish) colour when bred for show quality.





Fawn Self buck  
(A/- r/r)

**FAWN**

“A rich golden fawn colour, evenly ticked with silver grey guard hairs. Undercoat a pale grey colour. Belly fur a creamy silver colour. Eye colour is very dark ruby.” – S.A.R.F.C.

Fawn is a much darker and drabber colour when compared to amber. Amber rats are a bright colour whilst fawn rats almost have a grey cast when compared to amber. As with beige the key feature of a fawn rat is the dark ruby eyes which almost appear black in poor light. Baby fawn rats are duller than adults. Fawn rats should be selected for a more golden coat colour when breeding for show quality.

**AUSTRALIAN RED EYED DILUTION**

**BUFF**

The Australian version looks similar to the beige described above. They have dark ruby eyes but the coat is more yellow-cream in appearance to that of a beige rat. Buff is darker than champagne.



Comparison between Buff (a/a p(d)/p);  
Champagne (a/a p/p) and Beige (a/a r/r)

**TOPAZ (KNOWN AS FAWN IN AUSTRALIA)**

Topaz is close to fawn in colour, but with a greyer cast to the coat than fawn. Topaz rats have dark ruby eyes. The guard hairs of topaz rats are much darker than that of fawn rats, which is the reason

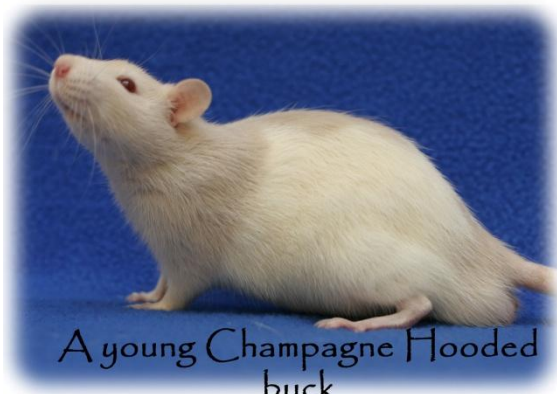
for the greyer appearance. Topaz is much darker than amber.



Comparison between Topaz (A/- p(d)/p); Amber  
(A/- p/p) and Fawn (A/- r/r)

**Genetics**

## PINK EYED DILUTION (p) AND AUSTRALIAN RED EYED RATS



A young Champagne Hooded buck  
(a/a p/p)

Pink eyed dilution is caused by the recessive gene, symbolized as p, located on chromosome 1 (Kuramoto, et al., 2005). A black based pink eyed dilute rat is champagne (a/a p/p) and an agouti based pink eyed dilute is amber (A/- p/p).

I have test crossed Australian red eyed dilution with pink eyed dilution (p) to study its inheritance and to my surprise found a whole litter of "pale topaz" and "pale buff" kittens. This shows that Australian red eyed dilution is in



Amber x Buff test  
cross F1 litter

fact a form of pink eyed dilution. It must be another allele on the P-locus, since the two genes behave like alleles and not two separate genes (I would have gotten agouti and black kittens then).

## RED EYE DILUTION (r)



Beige Self doe  
(a/a r/r)

Red eyed dilution is caused by a recessive gene, symbolized as r, located on chromosome 1 (Kuramoto, et al., 2005). A black based red eyed dilute is beige (a/a r/r) and an agouti red eyed dilute is fawn (A/- r/r). Connie Perez test crossed Australian red eyed dilution with red eyed dilution (r) and found the two genes are not related. Her whole litter was unexpectedly agouti and black, showing that these two genes are not related (Perez, 2003).

For that matter, pink eyed dilution is also unrelated to red eyed dilution. If you cross a champagne/amber rat with a beige/fawn rat you will only get black/agouti kittens.

For that matter, pink eyed dilution is also unrelated to red eyed dilution. If you cross a champagne/amber rat with a

## Health problems with red eyed dilution (r)



Fawn Self buck  
(A/- r/r)

We had considerable health problems with the imported red eyed dilution rats we imported in 2006. My very first beige rat I got from Liezel (from the MS Wolf x MS Raven cross) bled to death when giving birth. I continued the fawn line with her brother MS Tau, but later discontinued it due to severe bleed out problems. If you decide to breed fawn and beige rats in South Africa be extra cautious about bleeding out during birth. I would recommend to rather using black and agouti female which carry the r gene instead of beige and fawn females.

It is also a scientific fact that red eyed dilution causes bleeding problems. Red eyed dilution

causes malformation of the organelles: melanosomes, lysosomes, and platelet dense granules. This leads to the colour mutation but also to abnormal platelet function which leads to profuse bleeding (Rat behaviour (Where do rat colours come from, 2003-2004).

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Amber Hooded buck  
(A/-p/p)



Amber Berkshire doe  
(A/-p/p)



Amber Self doe  
(A/-p/p)



Champagne Self buck  
(a/a p/p)