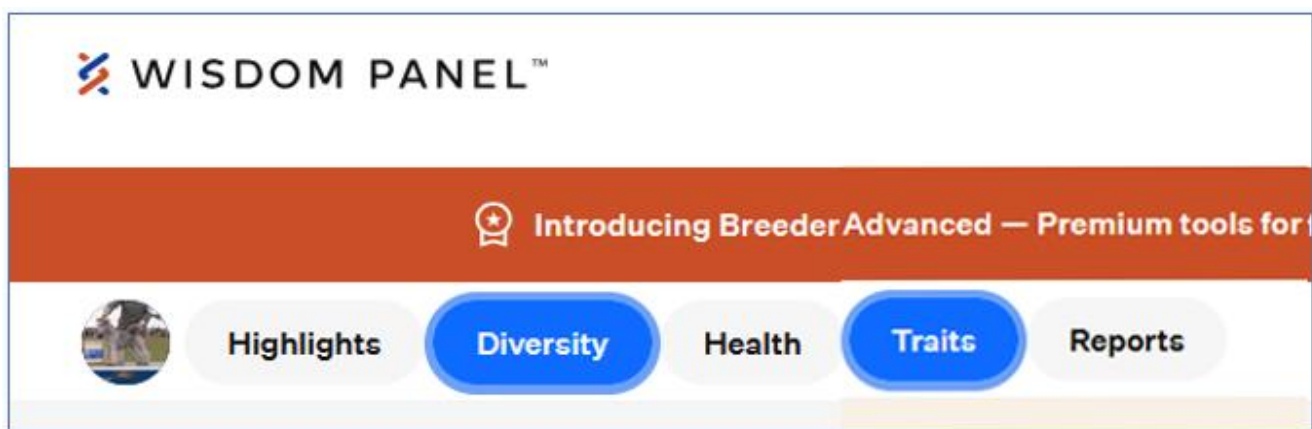


Entering DNA Info in Pedigree Database Online (PDO)

Most Pumi owners are using Wisdom Panel's DNA information and the HPCA recommends this laboratory because it has the largest number of Pumik in its database (over 400).

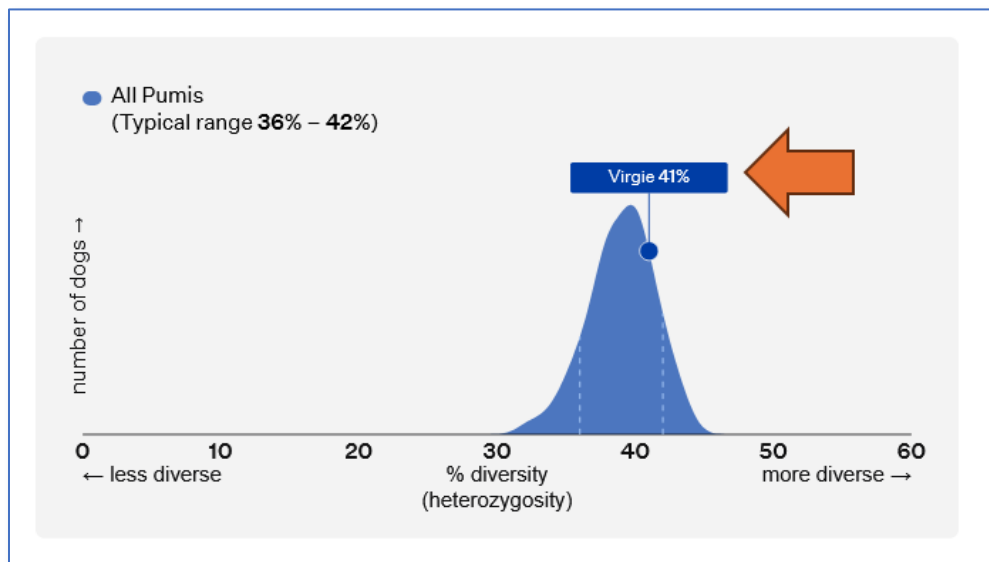
The DNA Info section in Pedigree Database Online looks like the following. This document will help a user enter their information into the database and also explains a bit more about these genes. For additional information, see Wisdom Panel's website.

There are two places to get this information on the Wisdom Panel website, the *Diversity* and *Traits* tabs.



Diversity

Your Pumi's diversity percentage is on the graph. In this case Virgie's is 41%. Write in the percent sign, too.



Traits

The Traits tab has everything else we track. They're listed below. If your dog doesn't have that gene you'll need to expand the selection to find it on a link like this:

[4 more coat color trait results ▶](#)

Traits Cheat Sheet

The important thing to remember, in almost all cases a dog can only have 2 genes for a specific trait, one from their father and one from their mother.

Wisdom Panel	Pedigree Database Online				
		2 genes	1 gene	0 genes	
Coat Color					
• Dominant Black	K Locus	KB/KB	KB/ky	ky/ky	
• Fawn	A Locus	Ay/Ay	Ay	-	See explanation below if the number of genes is greater than 2.*
• Tan Points*		at/at	at	-	
• Recessive Black*		a/a	a	-	
• Recessive Red (e1)	E Locus	e/e	E/e	E/E	
• Mask	E Locus (Em)	Em/Em	Em/n	n/n	
Color Modification					
• Chocolate (basd)	B Locus	b/b	B/b	B/B	If you had 1 bc and 1 of bs, it would be bc/bs.
• Chocolate (bc)		bc/bc	B/bc		
• Chocolate (bd)		bd/bd	B/bd		
• Chocolate (be)		be/be	B/be		
• Chocolate (bh)		bh/bh	B/bh		
• Chocolate (bs)		bs/bs	B/bs		
• Dilution (d1)	D Locus	d1/d1	D/d1	D/D	If you had 1 d1 and 1 of d3, it would be d1/d3.
• Dilution (d2)		d2/d2	D/d2		
• Dilution (d3)		d3/d3	D/d3		
Coat Patterns					
• Piebald	S Locus	s/s	S/s	S/S	
Extra Toes					
• Hind Dewclaws (Western breeds)	Hind Dewclaws	2	1	0	In this case we just list how many genes.

* The number of genes on the A Locus should add up to 2. If there are 3 or 4 it's because the "a" gene sometimes combines with the "at" gene and is designated as ata. So you could have a dog with 2 at genes and 1 "a" gene and it would show up as "at/ata"

^ DNA Info ≡	
• Diversity:	38%
• K locus:	KB/ky
• A locus:	Ay/ata
• B locus:	B/B
• D locus:	D/D
• E locus:	E/e
• E locus (Em):	Em/n
• I locus:	N/ln
• S locus:	S/S
• Hind Dewclaws (# genes):	0

To the left is an example taken from the database. Older tests run by Wisdom Panel may not provide results on all of these as they add newly discovered gene tests every year. (A few of these were added to the PDO in August 2026.)

Read further for more detailed information on each of these traits.

Details About These Genes

The following information is taken largely from Wisdom’s Panel’s website and augmented with information on the Pumi specifically.

Diversity %: Genetic Diversity

Labs look at thousands of specific markers in your Pumi’s DNA to determine how related your dog’s ancestors were. At any site, the DNA your Pumi inherited from each parent is either the same or different—scientists refer to these states as “homozygous” and “heterozygous”, respectively. The overall percentage of heterozygous sites is a good indicator of its genetic diversity.

Different breed populations will have different average levels of heterozygosity. It’s also worth noting that genetic risk isn’t just a problem for pure breeds.

If you plan on breeding your Pumi, pairing them with a mate that shows a higher percentage of heterozygosity will decrease the genetic risk of their litter.

K locus: Dominant Black

The Dominant Black variant is responsible for black and brindle coat colors. The Dominant Black variant is also known as KB (or Kbr if brindle). One or two copies of the dominant black will give a dog a black coat (depending on other variants), black eye rims, nose and pads. One copy may also give a tiger striped appearance, known as brindle patterning. There is yet no test for brindle, but it does occasionally appear in the Pumi.

For more detailed information go to <https://avian2.animalgenetics.com/Canine/Canine-color/KLocus.asp>.

A locus: Fawn/Sable, Tricolor/Tan Points, Solid Black

These colors will only affect the Pumi's color when the K locus is ky/ky. They are listed below in order of dominance.

Fawn (Ay)

The Fawn variant is one of the most common red coat patterns in other breeds, not as much in the Pumi. It is responsible for a coat with a red base, and dark-tipped hairs, often darkest over the forehead, ears, spine and tail. This is why the Hungarians called it "Maskos Fakó", Masked Fawn.

Agouti (aw)

This is the *wild type*, not a mutation and results typically in banded black/grey/white hairs similar to a Keeshond. They can also look slightly tannish colored and have lighter colored legs. This is the Schnauzer Salt & Pepper color. The labs don't test for this, but list it by default if there is only one or zero of other of the A locus genes.

Tan Points (at)

The Tan Points variant is responsible for a distinct symmetrical pattern of tan and dark pigment, with tan markings on the eyebrow, cheeks, chest and lower legs. This variant is also required for a saddle tan pattern to occur. In Pumik we call it Black & Tan.

Recessive Black (a)

The Recessive Black variant is a rare cause of black coat color. The Recessive Black variant, also known as the "a" variant, is found in the ASIP gene (known as the A locus). Since this gene is recessive to all the others, two copies of are needed for a black coat to be seen, and also an absence of other coat modifying variants such as chocolate and recessive red.

For more detailed information go to <https://avian2.animalgenetics.com/Canine/Canine-color/ALocus.asp>.

B locus: Brown

The dominant gene is black and the recessive mutation is brown – coat and skin/nose pigment. There are 3 variants of this b gene, b^s, b^d, and b^c. All 3 have been detected in the Pumi. (But if your Pumi is also e/e, it will be white with brown nose and pads.) Almost all Pumik are B/B.

For more detailed information go to <https://avian2.animalgenetics.com/Canine/Canine-color/BLocus.asp>.

D locus: Dilution

The Dilution variants cause a lightening or dilution of all pigment including skin, noses, pads, and eyes. Dilute black pigment appears grey, and dilute chocolate pigment appears a creamy brown. Red or yellow pigment may show mild lightening of color.

Our convention for indicating this is to write out the variant name if it exists. For a dog with no dilution genes it would be D/D.

Some forms of dilution cause the dilute-colored hair shaft to be brittle, resulting in early breakage of the hair at or near the skin, which can cause skin irritation. This condition is called color dilution alopecia. The genetic cause of this disorder currently remains unidentified.

For more detailed information go to <https://avian2.animalgenetics.com/Canine/Canine-color/DLocus.asp>. There is good information on this site, but it's lacking information on d3.

E locus: Recessive Red

To be a solid red coat, a dog must inherit two copies of a Recessive Red variant, one from each parent. This can either be two copies of a particular variant, such as e1 which is the only "e" variant found in the Pumi. Recessive red coats will appear white, cream, yellow or red, although there are other variants that can result in a similar appearance. The amount of red pigment in the coat, called the intensity, is governed by the Red Intensity (I locus) genes. A dog with any black or brown hairs on its body is not a recessive red dog (in Pumik that would be a Fawn).

For more detailed information go to <https://avian2.animalgenetics.com/Canine/Canine-color/ELocus.asp>.

E locus (Em): Mask

The Mask variant causes dark facial hair, mainly over the dog's muzzle, which looks a bit like a mask. The Mask variant is also known as Em and is found in the MC1R gene (known as the E locus).

This is a dominant trait, and one or two copies of the Mask mutation will result in the presence of a dark facial mask covering the muzzle. This mask may cover only the very front of the muzzle, or can extend down to the chest and front legs. Mask can be hidden by other trait variants. In the Pumi we're not sure how this expresses itself on which colors and that's why we're tracking this gene.

For more detailed information go to <https://avian2.animalgenetics.com/Canine/Canine-color/ELocus.asp>

I locus: Red Intensity

The Red Intensity variant causes a decrease in red (phaeomelanin) pigment concentration in the coat. Pheomelanin is the pigment responsible for red, yellow, and pale cream coat colors. Many breeds that appear white are actually recessive red dogs with the Intensity variant, which is why their eye, nail, and nose pigment remains dark.

Dogs with two copies of the Red Intensity variant are more likely to show yellow, cream or white coat shades instead of deeper red shades. If the dog is not e/e (another color such as grey), there

will be no visible effect. Other genes are also thought to contribute to red pigment intensity variation, so some dogs may have yellow or buff colored coats.

Dogs with 0 gene should show as N/N (Normal), dogs with 1 gene as N/In, and dogs with 2 genes as In/In.

For more detailed information go to <https://vgl.ucdavis.edu/test/intensity-dog>.

S locus: Spotting/Piebald

The Piebald variant causes white spotting, patches and/ or a completely white coat. It can also cause blue eyes, pink or "butterfly" nose, pink eye rims, white toenails and pink paw pads. The Piebald variant is known as the S locus.

White spotting is not a color, but a lack of pigment. Pigment is necessary for normal vision and hearing development, so if white spotting covers the area of the ear, the dog may be deaf in that ear. Dogs at greatest risk are those with very few colored spots. This risk does not apply to dogs whose white color is due to the recessive red gene.

For more detailed information go to <https://avian2.animalgenetics.com/Canine/Canine-color/SLocus.asp>.

Hind Dewclaws (# genes)

Hind dewclaws are thought to be a genetic throwback, called an atavism, to the digits lost during dog evolution.

One or two copies of this Hind Dewclaws variant may result in your dog having hind dewclaws. Around half of the dogs with one copy of this variant will have hind dewclaws, and it is possible for the dewclaws to be just on one leg. With two copies the trait is more likely to be expressed and could be more pronounced.

Gene Frequencies in the Pumi

Wisdom Panel provided the following information to the HPCA to help us decide what information to carry in the Pedigree Database. There were other traits that almost every Pumi had, or none had so it didn't make sense to keep track of them. The HPCA Board approved the additions in June of 2026.

Locus	Name	# dogs	0 copies	1 copy	2 copies	Frequency
K Locus	Dominant Black	275	16	123	136	72%
A Locus	Fawn	275	207	67	1	13%
	Recessive Black	275	132	120	23	30%
	Tan Points	273	24	96	153	74%
B Locus	Chocolate (bc)	275	268	7	0	1%
	Chocolate (bd)	275	268	7	0	1%
	Chocolate (bs)	275	264	11	0	2%
D Locus	Dilution (d1)	247	199	48	0	10%
	Dilution (d2)	273	271	2	0	0%
	Dilution (d3)	247	225	22	0	4%
E Locus	Recessive Red (e1)	275	83	140	52	44%
E ^m Gene	Mask	274	237	36	1	7%
I Locus	Red Intensity	244	14	115	115	71%
S Locus	Piebald	275	273	2	0	0%
Hind Dewclaws	(Western breeds)	275	166	101	8	21%

- 0 copies – there were this many dogs without that gene.
- 1 copy - this many dogs were carriers
- 2 copies – this many dogs were homozygous or had 2 copies of that gene.