Health status of the Český Fousek breed– continued

By
Ing. Silvie Neradilová
Bc. Iveta Dočkalová
First published in Český Fousek Klubový zpravodja 2/2021

In addition to the results of Embark disease testing mentioned in the last issue of the newsletter, we present results of other, as yet unpublished, characteristics that did not fit into the last issue. These are a variey of visual characteristics and genetic aspects. At the end of the article, the results of a questionnaire survey on the longevity of ČF and the most common causes of death found in the survey are presented.

Embark - appearance characteristics

You may be wondering why some genes have more records than others. This is because the Embark chip (the Embark test) is evolving every year and additional characteristics and diseases are added to it. Therefore, for individuals tested several months to years ago, some information is missing.

Embark offers testing of a total of 28 appearance characteristics, the most important for our breed are:

D (dilution) - gene controlling color dilution. Individuals of recessive homozygotes in this gene (dd) have a color like the Weimaraner or the Slovak Coarse Haired Pointer (SHO). Mr. J. Dostál recommended ČF with diluted coat color (dd or heterozygotes Dd) as suitable for reviving the SHO breeding. One heterozygote (Dd) of this diluted appeared in a total of 208 records. It can therefore be assumed that although rare, the dilute coloration may occur in Whiskers.

S (white spotting) - a gene controlling spotting. It determines whether the dog is white (spsp) or brown, which is obvious at first glance.

However, this gene is interesting in brown dogs where it shows whether the dog is dominant (SS) or non-dominant (Ssp). Just as a reminder, the dominant brown dogs will only have brown puppies. However, the non-dominant (Ssp) dogs can produce white and brown puppies. Out of a total of 187 records where we ave data for this gene, there were 125 white (spsp), 55 non-dominant brown dogs (Ssp), and seven dominant brown dogs (SS).

Roan - newly included in the Embark test. It is thought to co-determine the distribution of ticks and roaning on the body and could therefore help detect carriers of the mostly white dogs also called " strakoš" a non-standard coloration. These dogs have large areas of white with no ticking or roan. Unfortunately, because the gene was newly included in the Embark analysis this year, many of our dogs were not tested for it. So, we have to wait for the newly tested individuals and their results to be able to evaluate exactly what the gene determines in our breed.

F (furnishings) - a gene determining the distinctive features of eyebrows and beard (beardiness) in coarse-haired breeds. This gene is probably known by all whisker breeders. It determines how rich the hair of the head (eyebrows and beard) the dog will have. Out of a total of 162 records, there were 147 dominant bearded individuals (FF), 15 carriers of asymptomatic (Ff) and 0 beardless (recessive individual; ff). I remind you that if the dog has a shorter coat on the body, it also shortens these features on the head. The appearance of some individuals is therefore misleading, they do not appear to be dominant in this gene, and yet they reliably transmit strong traits to their offspring. The coding of the length of the fur on the body of the whiskers has not yet been fully elucidated.

The table below shows the percentage of puppies without traits (beardless puppies) to be born to two parents without markers:

<table>
<tr><td></td><td colspan="2">Father Ff</td></tr>
<tr><td rowspan="2">Mother Ff</td><td>25 % puppies FF
have beards
and transmit them reliably
to their descendants</td><td>25 % puppies ff
have no beards</td></tr>
<tr><td colspan="2">50 % puppies Ff
They have beards, but they are carriers of characterlessness</td></tr>
</table>

Rear dew claws – The gene determines whether an individual will transmit rear extra dew claws to offspring or not. These extra dew claws are nonfunctional digits located midway between a dog's paw and hock.

Out of a total of 207 records, 187 were "pure" (no extra claw) and 20 individuals were carriers whose offspring may have rear dew claws.

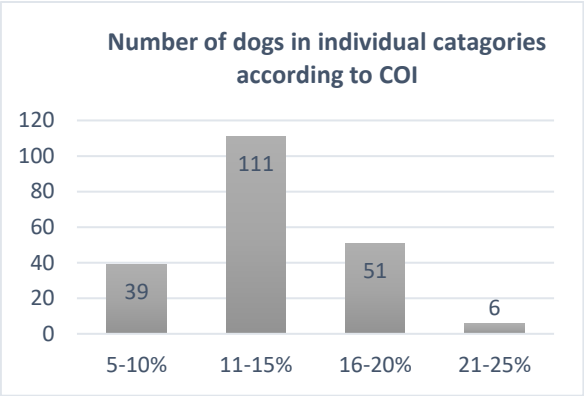
Note: we no longer remove front dew claws but we do remove rear dew claws in young puppies.

Embark – genetics

Other information that can be gotten from the Embark chip are the paternal and maternal haplotype, immune genes, and the coefficient of inbreeding is calculated.

Haplotypes are pieces of DNA that are inherited from either the maternal (mitochondrial DNA) or paternal (nuclear DNA-Y chromosome) line and can be traced essentially to the period of domestication, they have a so-called low mutation rates. Two paternal haplogroups covering five paternal haplotypes and four maternal haplogroups covering 10 maternal haplotypes were discovered in our breed. How our breed stands in comparison with others cannot be assessed, because so many individuals tested in one breed is a unique. As far as we know, some breeds have tested few or dozens of individuals, but having almost 250 individuals tested (if we take American dogs) is a rarity for the Embark test.

Inbreeding coefficient (COI) – Attention!! This is not a classic inbreeding coefficient (F_x), which can be calculated from pedigrees. The F_x is a different calculation, it is often calculated from only four generations of ancestors and much lower numbers are obtained. These two coefficients are not comparable. Embark COI determines how similar the parents' chromosomes are and should be more accurate than that of the pedigrees, because its calculation is based directly on the genomes of those individuals. Puppies from the same litter will have exactly the same F_x but can have widely different COI based on genetics. The average COI of the ČF population is 13.46%. If we divide individuals according to COI into groups by five percent, we get this distribution:



It is always better for the population to keep the COI as low as possible so that the decrease in genetic variability is as low as possible (slowest). The reduction of COI in whiskers significantly helped the addition of NKO (German shorthair) and NdrO (Deutsch Drahthaar) breeds in 2000. However, even the offspring from these outcrosses cannot resist increasing COI for long and after a few generations the value of the COI returns to the level of average values of the ČF population. The above-average population is 51 individuals, the very high COI had six dogs - in such cases it would be most appropriate to choose a potential partner so that it is as little related as possible.

Three immune genes are also tested, where the diversity within those genes is determined and the result is either "none", "low" or "high". Generally speaking, there we found that there was higher variability of immune genes, which is associated with better survival of individuals.

Embark - health

The results of this section were published in the last newsletter. We just want to update the knowledge. As of the closing date of this newsletter, we have registered a total of 12 genetically confirmed individuals - carriers of DM (10 in the Czech and two in the American population, which is three more than in the previous article) and one dog carrier revealed by pedigree analysis was born and bred in the Czech Republic (son tested as a carrier, mother of the son tested as "clean", so this dog is a carrier who transferred his DM gene to the son). We have about four more identified DM carriers than half a year ago. Another HUU carrier was found in the New Zealand population (this dog is not closely related to the three carriers already identified).

What did the EMBARK results show?

Maybe we didn't emphasize it enough in the last article or it wasn't obvious to everyone at first glance from the above statistics… The fact that CF came out "clean" for so many diseases is a huge success and a positive finding! No other breed has monitored such a large and representative sample of the population as the ČF now has, so that the claim that the breed is free of all serious testable hereditary diseases can be valid. In this we see a great opportunity to present our breed to the hunting public at home and abroad!!! However, the observed approximately 5% number of degenerative myelopathy (DM) gene carriers and approximately 1.5% the number of hyperuricosuria (HUU) carriers cannot be underestimated. So far, the percentages found are relatively low, but due to their concentration in certain lines, the intertwining of lines and the fact that our breed is small, the risk of progression of these genes in the population in the near future is more than real! We now have a great opportunity to prevent the emergence of diseases and their spread in the population. The good news is that we caught these carriers just in time, it is not too late to deal with this problem. This is also a huge success and an opportunity to suppress

these diseases in a gradual form without the need to exclude individuals from breeding. Because both identified diseases are autosomal recessive (an individual must obtain a gene from both parents in order to become clinically ill), all carriers are healthy, can be used successfully in breeding, and no individual needs to be excluded from breeding. However, it is essential to prevent a situation where two carriers of these genes would meet and thus prevent the birth of puppies with both recessive alleles of the DM and HUU genes.

Summary

The Embark Genetic Test is unique in its scope compared to other common genetic tests. A simple and one-time saliva swab with a brush will allow you to find out a lot of genetic information about the Czech mustache:

• Information on genes of more than 200 inherited diseases (e.g., DM, HUU, PRA, etc.)

• Information on genes related to appearance (e.g., beard, extra dew claws, color dominance in brown dogs)

• Information on COI, and diversity of immune genes.

• Raw data obtained from Embark are fully compatible with the data needed for alopecia research and all these individuals can be combined into one comprehensive dataset

A few observations in the end

1) If we solve the situation with DM and HUU carriers, then we can use the results of Embark to present ČF as a genetically very healthy breed. We caught the carriers of both diseases at the beginning and the situation is easily solvable so far.

2) Embark is a perfect and modern tool that can be used to breed a breed, increase genetic variability and heal the breed without unnecessarily excluding individuals from breeding, which would be a great loss for a rare breed.

3) Embark is an excellent complementary tool when assembling breeding pairs. It is certainly not possible to compile breeding pairs on the basis of so many parameters, and still select for alopecia. SELECTION FOR EVERYTHING SELECTION IS NOTHING! However, we can take the results of the Embark as a good tool for monitoring the population and its effective management, if all breeding individuals were tested. In addition, keep in mind that controlled breeding is not just about genetic testing, it requires knowledge, a sense of purpose and also experience, so the role of breeding consultants is and will remain very important. But Embark can help prevent the spread of certain diseases and ailments in the population while maintaining genetic variability. All you have to do is set priorities.

You can order the Embark test at https://embarkvet.com/ or you can contact the authors of this article. We will be happy to help with any additional questions.

Iveta Dočkalová - 603728798, ally281@seznam.cz

Silvie Neradilová - 734492940, neradilova@ftz.czu.cz

NOTE: In the US we now test all puppies that are submitted to the Cornell BioBank. Dogs previously submitted may or may not have been sent for genetic analysis.

How long do Český Fousek live and what are the most common causes of death?

I would also like to summarize the current results of a questionnaire survey on longevity and the most common causes of death in Czech mustaches. The questionnaire was placed on the KCHČF website and on a group of Czech Fousek breeders on social networks. Some records were obtained from the ČF database, the rest directly from the respondents.

The number of country records as of the June 2021 are as follows:

US	146
ČR	131
NL	6
NZ	4
FIN	1
FR	1
GE	1
SK	1
BEL	1
PL	1

The average life expectancy of Czech Fousek in the Czech Republic is 11.01 years. If we exclude individuals who have been the victims of accidents (collision with a means of transport, poisoning, injuries), the average life expectancy will increase to 11.42 years. The average life expectancy of the foreign population is 10.07 years, without accidents 10.49 years. The oldest beard reported in the Czech Republic reached

the age of 17, the oldest beard from abroad, however, also born in the Czech Republic, lived an even longer year, a respectable 18 years.

The most common type of housing in our country clearly remains outdoor housing in a pen and shed (49.5%), followed by a combination of outdoor and indoor housing (29%). Abroad, it is most often accommodation inside (88.1%).

The most common cause of death in the Czech population of ČF is cancer (38.5%), the second most common cause is "another health problem" (25.3%), the third most common cause is natural death (15.4%). Expenditure due to complications associated with old age (9.9%), accident (5.5%) and torsion (5.5%) was placed next. Abroad, the most common cause of death is “another health problem” (29.2%), with cancer second only (24.8%), accidents (13.9%), and death due to complications associated with old age (12.4%), torsion (10.2%), and natural death (9.5%).

If we take a closer look at the category "other health problem", we find that within this category in the Czech Republic the most common were movement problems (38.5%), liver / kidney failure (23.1%) and heart attack / heart problem. (19.2%). Abroad, it was most often the ingestion of a foreign object (toy or other inedible object (17.5%), movement problems (15%) and liver / kidney failure (12.5%).

Here I would just like to draw attention to cases where individuals were killed due to a movement problem. It is possible that individuals with DM or HD are also hidden in this category, however, none of these individuals was directly diagnosed with this disease, so this hypothesis cannot be confirmed.

The questionnaire will continue to be posted on the KCHČF and social network websites and it will therefore be possible to add additional records. We ask members who have not yet completed the questionnaire

for their whiskers to do so. Thank you to those who have already contributed their records!

Fouskům zdar! (Good luck to Fousek!)