

PAWS FOR EFFECT



*The PolyTrak  
Newsletter  
Fall 2011*

**Volume 5- Number 2**  
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# Paws for Effect - The PolyTrak Newsletter

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## WELCOME!

Welcome to another edition of *“Paws for Effect”*. Also a welcome to our new subscribers. You can add, remove or send us your comments or story ideas at any time by just emailing [ptnewsletter@polytrak.net](mailto:ptnewsletter@polytrak.net).

*“Paws for Effect”* is a Newsletter from PolyTrak, a worldwide database service that tracks information on the Maine Coon polydactyl. We are in our 5<sup>th</sup> year of publication. Each issue we try to feature articles of interest, not only for better understanding of the Maine Coon polydactyl, but also articles that may be of interest to the Maine Coon Breeder and Fancier, as well as the General Public. As always, we look forward to your ideas, suggestions and particularly your information and stories.

We admit that it has been some time since our last regular Newsletter. It has been a busy time at PolyTrak with many new Catteries, breeding Maine Coon polydactyls and lots of new poly litters, which keeps us in catch up mode a good share of the time.

This issue may be of special interest since we have two articles on discoveries during research being conducted in the World of the Maine Coon poly. The first, known as the “French Study” has been published with some interesting discoveries. Axel Lange, who is conducting his own study that will be published in the future through the University of Vienna, has reviewed the French Study of Alexia Hamelen and offers insight into the findings. PolyTrak’s Vonne Bode has looked into the goals and progress of the “German Study” and provides us with an update.

Sit back and enjoy this issue of *“Paws for Effect”*



Nova's Place For Everyman of Jem Cats  
The Netherlands

## POLYTRAK IS NOW ON FACEBOOK



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As we mentioned in our last issue of “*Paws for Effect*” we are now on Facebook with just under 500 fans. We invite you to join us for some great pictures and comments.

Welcome All!

Just plug this URL into your browser if you are a member of Facebook and enjoy.

<http://www.facebook.com/pages/Paws-for-Effect-The-Maine-Coon-Polydactyl/117223974963298>

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*If there is one spot of sun spilling onto the floor, a cat will find it and soak it up.*

*- Joan Asper McIntosh -*

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Genny Lou PP des Coons Salomais  
from Chatterie de Keracoon – Guilers, France

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**FRENCH POLYDACTYL  
STUDY PUBLISHED JUNE 30th  
FROM ÉCOLE NATIONALE  
VÉTÉRINAIRE D'ALFORT**

**Special to Paws for Effect by Axel Lang**

(Editor's note: Axel Lange, working with the University of Vienna - Austria, has reviewed the French study by Alexia Hamelin and has provided

PolyTrak with a summary and his comments of the result of Ms. Hamelin's findings. We are grateful to Mr. Lange for the contribution. Mr. Lange is presently involved in his own PhD of the polydactyl Maine Coon, which we will have a report on his findings in the future. Following is his report.

Alexia Hamelin

Polydactyly of the Maine Coon (La Polydactylie du Maine Coon)

Veterinary Medical Dissertation

June 30 2011

École Nationale Vétérinaire d'Alfort  
(Paris)

Summary and Commentary

Hamelin published the first analysis worldwide on preaxial polydactyly combining genetic and phenotypic data of about 100 Maine Coon cats. In the past we only had phenotypic data (Danforth, PolyTrak) of which one had to conclude on genetic traits or vice versa. DNA of a few polydactyl cats was analyzed in order to find the genetic loci of the mutation (Lettice et al., Edinburgh 2008). In this case the authors only had a few cats to confirm their genetic results.

The dissertation of Hamelin now makes the overdue step to sequence a larger number of cat DNA and to compare that data with the phenotypic output \*of the cats; i.e. the number and/or form of the toes. Hamelin could make use of 92 cats. Out of these 86 were Maine Coons, 5 were Pixie Bobs and one undetermined individual. 60 cats were analyzed genetically and X-rays were done of 60 cats.

The largest groups were a Canadian lineage with 41 individuals and the lineages America-1 with 14 individuals and America-2 with 9 individuals. (Hamelin 2011, app. 3). All Maine Coons (16 individuals) apart from the



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Canadian lineage show the Hw-mutation, which was detected by A. Lettice et al. (Hamelin 2011, Tab.11 u. 153). The mutation Uk1 appears only once and Uk2 is not seen at all in this study.

The Canadian lineage shows a mutation not seen before. This mutation couldn't be localized on the cat's DNA. This means, the mutation is not part of the ZRS. (ZRS is a region of 800 bp length on the DNA, detected by Lettice et al.) This region is not a real coding gene. Instead it is called a transcription factor, which in our case regulates the activity of a gene called Sonic Hedgehog (Shh). Shh itself has a major role in limb development. From an evolutionary perspective, ZRS is highly conserved. This means it is identical at many species and their predecessors for hundred millions of years and today it's still completely identical at mouse, cat and man).

Because Hamelin couldn't find the Canadian mutation within the ZRS, she expanded her search on a neighbored region of the ZRS which she named preZRS. This region is about 600 bp long and is responsible for polydactyly at the canine (92). But again in the preZRS Hamelin was not able to identify the mutation (153). So scientifically the question remains open whether preaxial polydactyly at the Canadian Maine Coon lineage is also part of the Shh signal transduction path.

Unfortunately without being able to localize the Canadian mutation we can't exclude that this mutation creates another phenotype other than Hw, Uk1 or Uk2. At least out of the 18 X-rays done with this lineage we don't see a skeletal bifurcation at the forehand, which is very common at Hw-polydactyl Maine Coon. Instead all extra toes are formed as complete units (122f) which leads to the well known patty foot form at the forehand. Surprisingly with one individual we see a bifurcation at the hind foot (119), which to my knowledge we couldn't observe earlier.

**We can summarize Hamelin's work as follows:**

1. The well known hypothesis is confirmed: "The analysis of the genealogic trees and the x-rays of numerous of polydactyl Maine Coons allows us to demonstrate that polydactyly at the considered Maine Coons is an autosomal-dominant trait with complete penetration and high variability" (153).
2. Preaxial polydactyly at the cat either exists at the forefeet or simultaneously at the forefeet plus hind feet (55)
3. The variability of the number of toes is not bound at certain lineages and therefore at the mutation, even more, it might differ within one mutation type. (155). There seems to be breeder lineages, which can generate specific polydactyl phenotypes or better: phenotype priorities (i.e. number or form of toes), which sometimes is claimed by breeders. However, Hamelin's statements in this point are based on very little empirical data as far as she relates to the Hw-mutation. Here for the lineage America-1 there is only two X-rays, for America-2 only three. One can't make statistical proofs with so little data.
4. Evidence of a further Canadian mutation beside the mutations earlier detected by Lettice et al. (2008) (Hw,Uk1,Uk2). This "new" mutation is not based within ZRS or a neighbored region.
5. Hypothesis that the Canadian lineage shows a specific phenotype



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(18 individuals with X-rays). Here polydactyly with the form 6-6-6-6 dominates. All the fore feet have one complete extra toe and almost all the hind feet have two complete additional toes. (This is not correct; in fact this lineage also shows different toe configurations, although 6-6-6-6 is the dominant. A.L.)

6. Hypothesis that the lineage America-1 shows PPD only at the forefoot and almost exclusively with a number of 6 toes (154). (This is not congruent with PolyTrak data A.L.) However, Hamelin indicates that there are only two X-rays to confirm this hypothesis. This means that the empirical material for the hypothesis of two different polydactyl phenotypes is very poor. But it's important to notice: If there is phenotypic variability within Hw mutants within different Hw-lineages. This would be an important hint that development can create regularities which can't be explained by genes alone; i.e. we need epigenetic development mechanisms (A.L.).
7. Detection, that the polydactyl Maine Coon shows variation in the carpal and tarsal bones. Disappearance of the pisiform bone, appearance of new tarsal bones analogue to the polydactyl toe(s) and fusion of carpal bones (109).
8. The assumption of some breeders, that the polydactyl cat may show stronger ulna and radius bones is tested as statistically not significant. Exact measurement of bone diameter of 15 non poly and 25

poly Maine Coon were undertaken for this analysis.

9. Empirical tests of reproduction, body height, peri-natal, mortality and malformation. None of those tests showed statistical significant differences between polys and non polys.
10. The first time it was shown on a larger number of cat individuals that the Hw-mutation doesn't lead to any other damage and is not associated with any other anomaly (96). Especially for the Maine Coon Hamelin summarizes: "Polydactyly of the Maine Coon is characterized by extra toes (per definition), by modification of the architecture of the carpal and tarsal bones and is seen without any other consequence on the morphology or the health of the cat". (158). However, other forms of polydactyly a special preaxial form which is only shown at the hind feet, can show syndromes as for example a radial aplasia (53).

On the other hand the dissertation doesn't deal with development pathways. Hamelin is not interested in answering how the ever so stunning variability of the number and form of the extra toes come to exist and how they are formed based on a simple moreover identical Hw-point mutation. It's even more unlikely that a point mutation can handle all that since Hamelin showed that the carpal and tarsal bones are also influenced and varied at the polydactyl cat. A new toe is a real complex apparatus of bones, muscles, nerves, joints etc. The polydactyl toe, in most cases, is wonderfully integrated into the infrastructure of the cat foot and functions perfectly. So there is some difficulty to explain its existence by reducing this fantastic story on a single point mutation.



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My own dissertation deals with embryonic, epigenetic processes, which are involved and which cooperate together in an orchestrated teamwork to generate a whole new organ like an extra functioning toe. So both dissertations will complement each others finely, Hamlin's work from the genetic side and mine from a developing and evolutionary evodevo-side. Having soon available both of the studies this should extend our knowledge of the polydactyl cat finely and might know a very piece more of nature's limitless wonders.

**Axel Lange**  
**PhD student**  
**Department of Theoretical Biology**  
**University of Vienna**



**Bristol P of Beetlejuice**  
**The Netherlands**

## **POLYDACTYL STUDY** **ZWITSERLAND**

**By Vonne Bode**



**I**n November/December 2010 an important new research concerning polydactyle in cats started at the genetic department of the University in Bern, Zwitserland. This research is led by Dr. Bianca Haase and by Prof. Dr. Tosso Leeb. The idea is that this study will follow through on the earlier UK study.

The goal of the study is to identify the causative mutation for polydactyly in cats and elucidation of the genetic polydactyly in terms of the Semi-lethal. This outcome is especially very important for all breeders in Germany working with this trait. But not alone! Many cat associations exclude the polydactyl trait in the breed/show standard because they believe it's a harmful trait. Unless they have scientific written proof saying nothing is wrong with this trait, they won't be so open to welcome the Maine Coon polys in the show hall. And if we have the proof, the only objection that will be left is probably based on taste. And I don't think taste is a legitimate reason to exclude the Maine Coon polys from the show bench. 😊

### **What is needed to make this is valuable study in getting the Maine Coon accepted?**

To achieve a representative result they need lots of Maine Coon poly DNA. 😊 The bigger the group of cats participating in this study, the better. They can use DNA material from the cheeks (swabs) or EDTA blood samples. Ideally would be to send material of all the siblings (non poly and poly) and their parents. If you are not able to send blood samples you can also request for cheek swabs through following e-mail address:



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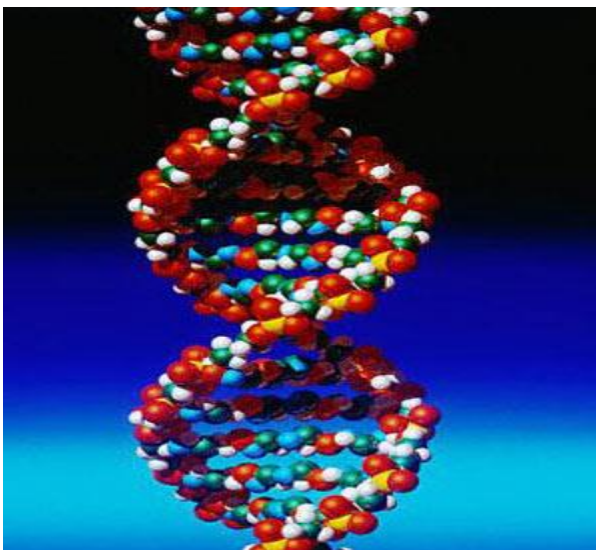
[wakpalalutaroth@yahoo.de](mailto:wakpalalutaroth@yahoo.de) If you would like to participate and contribute to this study by sending DNA samples, please follow the instructions and fill out the form underneath the following link:

[http://www.genetics.unibe.ch/unibe/vetmed/genetic/content/e2353/e3265/e3270/files3271/Probe-neinsendeformular\\_Katze\\_Poly\\_e\\_2011Apr07\\_eng.pdf](http://www.genetics.unibe.ch/unibe/vetmed/genetic/content/e2353/e3265/e3270/files3271/Probe-neinsendeformular_Katze_Poly_e_2011Apr07_eng.pdf)

You can fill out the form on your computer and print it. It's also necessary to send a copy of the pedigree together with the form and the DNA sample. DNA (blood) samples should be clearly labelled with the name of the cat.

This study is very, very important for German breeders. It must show that our polys do NOT suffer of a semi-lethal defect, which is the reason it is officially forbidden to breed polydactyl Maine Coons in Germany. With this outcome the polydactyl trait can finally be removed from the agony breeding section. Which would make breeding and showing these beautiful cats in Germany finally possible.

The researcher hopes to have the results mid 2012. So get your samples ready to be send, because time is short!



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**“Of all domestic animals the cat is the most expressive. His face is capable of showing a wide range of expressions. His tail is a mirror of his mind. His gracefulness is surpassed only by his agility. And, along with all these, he has a sense of humor.”**

**- Walter Chandoha -**

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## **POLYTRAK FACT**

In early October there were 1070 kittens listed in PolyTrak born as part of a polydactyl litter. 595 (or 55.6%) of these kittens listed are polydactyl.

- 7 Kittens (1.3%) are 1WD
- 224 Kittens (39.1%) are 2FWD
- 8 Kittens (1.5%) are 2RWD
- 38 Kittens (6.4%) are 3WD
- 303 (51.7%) are 4WD
- 15 Kittens have unknown paws
- 551 litter kittens are from poly Sire
- 455 litter kittens are from poly Dam
- 45 litter kittens – both parents are poly
- 7 litter kittens have homozygous Sire
- 6 litter kittens have homozygous Dam
- 6 litter kittens have Heterozygous Sire and Homozygous Dam

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**Happy Halloween!**



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## IT'S TIME TO SHOW OFF YOUR POLY!

If you are making your 'to do list' for this weekend don't forget to add: entering your cat(s) for the **Cats and Tulips** show in **Hellevoetsluis (NL)**, about 30 minutes from Rotterdam). The show will be on **5 & 6 November** at [Sporthal de Eendraght](#)

Just a quick reminder in case you forgot: The theme of the show is Holland. So come on...this is your opportunity to dress up with the colours red, white and blue. And don't forget that fantastic colour Orange...the Dutch national colour (as every football fan will know)!!!!

This is a vetted show. The veterinary check-in will be from 8:00 till 9:30 AM. The show starts at 10:00 AM. We will have 10 rings with the following amazing judges:  
**\*Monika Dany (Austria), \*Harley Devilbiss (USA), \*Pascal Remy (France), \*Robin Sessler (USA) and \*Irene van Belzen (NL).**

### What else?

1. We have four extra congresses for that title:
  - On Saturday we've the **Cheese Male congress** and the **Forest & Jungle congress**. The Forest & Jungle congress is for Maine Coons, Siberians, Bengals and Norwegian Forest cats.
  - On Sunday there's a **Zealands Female congress** and a **Red, White & Blue congress**. The **Red, White & Blue** congress is for all cats with one or more of these colours
2. Our regular show photographers Poezels will be there to take that perfect picture.
3. On Saturday evening there will be a lovely banquet at the restaurant of Citta Romana (€35).
4. Sunday we will have our famous raffle with prizes for everyone!

5. Last but not least as with every show we have a great offer: after your first two entries every new entry only costs €10!!!

So five good reasons to go this show...  
And I'll add number...

6. One of the few occasions to show your MC poly to the judges and the public in a show setting!

Cats and Tulips organiseert 2 shows per jaar, dit jaar is dat op 5 en 6 november 2011, te Hellevoetsluis in de sporthal de Eendraght. Ook dit wordt weer een erg gezellige show die u zeker niet mag missen.

Internationale Kattenshow  
5 & 6 november 2011  
Sporthal de Eendraght.  
Hellevoetsluis.  
<http://www.catsandtulips.nl>

Cats and Tulips  
The Dutch TICA club

INTERNATIONALE KATTENSHOW | HELLEVOETSLUIS  
<http://www.catsandtulips.nl>

Are you coming from abroad or living a bit far away? No problem 😊...we've some great accommodations selected for you that are nearby and allow pets:

### Hellevoetsluis

- Resort Citta Romana, [www.cittaromana.com](http://www.cittaromana.com)
- De Schoone Woerd, [www.schoonewoerd.nl](http://www.schoonewoerd.nl)

### Rockanje

Bad Hotel Rockanje, [www.badhotelaanzee.nl](http://www.badhotelaanzee.nl)

### Oostvoorne

Bed&Breakfast van Marion,  
[www.benbvanmarion.nl](http://www.benbvanmarion.nl)



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Again this will be a nice show with a good atmosphere. So don't be shy and enter now and enter often!!!

Here you go to online entry form:  
<http://members.ziggo.nl/pacificats/entryform.html>

For more details just open the show flyer:  
[http://www.catsandtulips.nl/aanvraagformulieren/Flyer\\_%20Hellevoetsluis\\_%20oktober\\_%202011.pdf](http://www.catsandtulips.nl/aanvraagformulieren/Flyer_%20Hellevoetsluis_%20oktober_%202011.pdf)



## KITTEN NUMBER 1000 NOW IN DATABASE!

By Ken Bussard

In May of this year (May 12<sup>th</sup> to be exact) a young guy named *Leather and Lace Mystery of Love PP* became the 1000<sup>th</sup> kitten to join their brothers and sisters over the years in the PolyTrak Database. Congratulations to John and Paul from Leather and Lace Cattery in Spijkenisse (Holland), The Netherlands. Mystery of Love PP is a white poly with extra toes all the way around or a 4 Wheel Drive (4WD) kitten as we call them. He has seven digits on each front paw – a dewclaw, thumb, another dewclaw and 4 toes on each front paw and an extra dewclaw on each hind paw. A total of 24 digits.



**Leather and Lace Mystery of Love PP  
From Cattery Leather & Lace – Holland**

Thank you John for submitting him and for your efforts in promoting the Maine Coon polydactyl. A big thanks to 999 other kittens who came before Mystery of Love PP and to their Breeders for their participation in PolyTrak. These Breeders, included in the present 134 Maine Coon Breeders that are working with the poly in our database program, have made PolyTrak the largest repository of Maine Coon polydactyl information in the World. We are presently at 1070 kittens, with



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several in the wings waiting to be entered. This totals up to over 1500 cats in our database in the last 5-1/2 years. We couldn't have done it without the help of all of you.



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(Editors Note: *Paws for Effect* would like to feature a Cattery, Fancier or Show Person in each issue of our Newsletter. We request, in fact encourage, all to submit articles of interest and pictures to our Newsletter. You may write the story yourself or we would be glad to give you a hand, if you desire. Just email us at: [ptnewsletter@polytrak.net](mailto:ptnewsletter@polytrak.net). Unfortunately we do not have one for this Issue.



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## THE 8 DIGIT MC POLY? (We need X-rays!)

You may have noted from the stories in this Newsletter there is a lot going on in the research and study world regarding the Maine Coon polydactyl. For years we have been without a lot of research regarding polydactylism. Today we know much more about the harmless effect of polydactylism in the Maine Coon. There is always more and more we desire to know. To this end was one of the many goals of PolyTrak. We formed a voluntary Group of 5 of us to work with Breeders, Fanciers and the Research Community to assist in gathering and presenting this information to anyone.

We all have learned much from this exercise. One of those things: is the fact we have dispelled the rumour that the number of digits can run unchecked and that we ultimately will end with cats that have an excessive number of digits. We know now that this is not physically possible and that it does not happen. In fact out of the 1000 plus kittens and nearly 500 Breeding Cats only 2 kittens have exceeded 7 digits (This is about 0.2% of the poly MC kitten population). X-ray evidence was used extensively in the recent French Study and is an important and integral part of the University of Vienna Study being conducted by Axel Lange. Mr. Lange is in need of any X-rays of an 8 digit poly that you may have or know about. There is financial help available for this X-ray. Please let us know at [ptnewsletter@polytrak.net](mailto:ptnewsletter@polytrak.net) or directly to Mr. Lange direct at: [axel-lange@web.de](mailto:axel-lange@web.de). Your help would be very much appreciated.

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That's a wrap for another Issue. We hope that you will join us again for more of the latest news from PolyTrak. Visit PolyTrak at <http://www.polytrak.net> to see archived issues of "*Paws For Effect*" dating back to January of 2007. And we would love to see you on Facebook's "*Paws for Effect – The Maine Coon polydactyl!*".

## Poly Power! Bye for Now

# Happy Halloween!

