FOXTALES

November 2011

Ch. Ultra Quest Be Bop'n BeBe

Gr. Ch. Ultra Quest Be Bop'n Bobbie x Ultra Quest Ticket To Paradise

Shown here by Bergit Kabel finishing her championship under Mr. Warren D. Hudson

WESTGATE TOY FOX TERRIERS

"Quality doesn't cost, it pays!"

The Votes Are In!

Here are the results for our judges for 2013 and 2014!

Tom Kilcullen for our 2012 Specialty and Nancy Hafner for our 2013 Specialty. Also rans are Ray Swidersky, Mrs. Robert Polly Smith, Betsy Dale, Tim Catterson and Michael Dachel.

For our Sweepstakes for 2013, Lynn McKee has been chosen, and Joan Krumm for 2014. Also mentioned were Sharon Pothast, Connie Blanken, Cindy Enroughty, Richard Camacho, Alice Sturm and Clay Williams.

Thank you all for voting, and may the best man (oops! DOG) win!

Results of our Annual Election Reported November 17, 2011

President - Mike Massey

Treasurer - Susan McCoy

Two Year Board Seats - Lynn McKee and Kasey Mando

One Year Board Seat - Rick Lilly

Thanks to everyone for voting, this is the democratic way and gives everyone a voice in our governing. Congratulations to those who were re-elected and to those to new positions ... hopefully, this will end the constant bickering and fault finding of the few, and bring a period of peaceful cooperation to our endeavors!

Officers, Board of Directors, Committee Chairs for Club Year 2010

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ATFTC COMMITTEES

Show Chair: Angie Sanders
Judges Selection: Dorothy Kendall
Trophies: Lynn McKee
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Affliate Council: Rick Lichty
Club Pins: Lois Davis

Performance: Kathy Marble-Brown
ATFTC Website: John David Zieba
Health: Connie Blanken
Education: Roger Pritchard
"Fox Tales" Newsletter: Dorothy Kendall
Historian: Chris Bowker

Breeder Referral: Lila Fast
Membership: Dorothy Kendall
Awards: Carolyn Lichty
Breed Standard Revision - Cindy Clark

Please note: If you would like to work on a committee, or have a question or concern, please contact the committee chair or club president Roger Pritchard.

Deadlines for the coming 2011 Issues of Fox Tails

Advertising Rates:

Front Page (color)	$65.00	Inside Page (black & white)	30.00
Back Page (color)	60.00	Business Card	7.50
Inside Page (color)	45.00	Advertising in color	60.00

All submissions must be accompanied by payment for advertising and sent to:
Dorothy Kendall, 421 Daisey Rd., Clayton, DE 19938
Orlane@fast.net
Photos will be returned if they are sent with a stamped, self-addressed return envelope.

The ATFTC does not endorse, support or recommend any advertisers.

Deadline Date	Delivery Date	Reason
March 1st	March 15th	After deadline March 1st for dues
June 1st	June 15th	Pictures and information about the National Show
August 27th	September 1st	Nominating Committee suggestion by September 1st
November 27th	December 1st	Election Results

TREASURER REPORTS

Beginning balance as of 8/1/2011 $13,163.21

Income	Expenses
$90.87 - Roger Pritchard (returned funds to ATFTC for incorrect mailing of ballots) $15.00 - Ed McKee (membership renewal)	#1204 - $273.70 D. Kendall (postage, ink, paper, printing) #1205 - $ 80.45 Copper Conferencing (July board meeting) Total expenses: $354.15
Total income - $105.87 New Balance: $13,269.08	

New Total balance as of 8/31/10 - $12,914.93

Beginning balance as of 9/1/2011 $12,914.93

Income	Expenses
$1380.00 - Dues $100.00 - Onofrio (money withheld for possible returned checks) $ 65.00 - Newsletter Ad $ 24.00 - (fees paid for 2 NSF checks)	#1206 - $40.00 - S. Sabol & V. Kerley (refund of dues payment) #1207 - $2,000.00 L. McKee (trophies for 2012) #1208 - $100.00 - AKC (deposit for 2012 Nat'l) #1209 - $165.00 - AKC (Eukanuba medallions 2011) #1210 - $209.22 - D. Kendall (postage, ink, Datarealm, WA Sec. of State) Total expenses: $2,514.22
Total income - $1,569.00 New Balance: $14,483.93	

New Total balance as of 9/30/11 - $11,969.71

Beginning balance as of 10/1/2011 $11,969.71

Income	Expenses
$585.00 - dues $ 20.00 - Rescue Donation	#1211 - $ 44.00 D. Kendall (postage) The following checks out of sequence per R. Pritchard #1250 - $136.80 - D. Kendall - postage & postcards #1251 - $40.00 - K & D Chestnut (returned dues for withdrawn membership application) #1252 - $160.00 - R. Pritchard (returned dues paid for withdrawn membership apps - Reed, Wood, Neal & Foster) #1253 - $140.00 - J. Pardue (returned dues paid for withdrawn membership apps - Flores, Garcia, Garcia, Barton & Rhoades) #1254 - $20.00 - Toy Fox Rescue, Inc. for donation from Fernandes Total expenses: $540.80
Total income - $770.00 New Balance: $12,739.71	

New Total balance as of 10/31/11 - $12,198.91
Regular Account - $12,033.91
Trophy Fund - $165.00

Central OK TDC/Toy Fox Terrier

2012 May 19-20	2012 May 17-18
2013 May 18-19	2013 May 16-17
2014 May 17-18	2014 May 15-16
2015 May 16-17	2015 May 14-15

Toys did well!

In 2010, 38,275 AKC agility titles were earned by 190 breeds. Here is the breakout by group:

SPORTING	20.0%
HOUND	2.9%
WORKING	6.4%
TERRIER	7.0%
TOY	8.4%
NON-SPORTING	6.6%
HERDING	44.1%
MISC/FSS	1.1%
All American Dog	3.4%

Annual and Quarterly Registration Statistics

Year - Quarter	Litters	Dogs
2011 - 1st Q	68	123
2011 - 2nd Q	68	124
2011 - 3rd Q	136	247

Blastomycosis - Fungus Found in Wet Areas with High Nitrogen

I believe the information is worth knowing by our members, even though Toy Foxes may not be running around in the woods or near streams. It isn't impossible for a yard to have wet spots, and with falling leaves have a higher than normal nitrogen level which would induce fungus growth, and thereby causing Blastomycosis to be very possible, particularly in the spring and fall. At least if Toy Fox owners are aware of this problem, they can mention it to the vet when they take a dog in for exam if it's showing signs similar to those caused by this disease. Please note that a pet owner lost a Minpin from this disease, as the Veterinarian wasn't familiar with it, and didn't treat it with the right antibiotic promptly. I do believe the Minpin had some other health issues that added to the problem, as it only lived 4 days after being in the woods on an outing.

Connie Blanken
Health Chair

Changing the way dogs are bred *By Amy Ettinger*

Genetic tests identify at-risk dogs and prevent diseases

When a dog develops blindness, the condition can be devastating for both the animal and its human companion. Almost all breeds of dogs can be affected by degenerative eye disease. Fortunately, researchers have a new understanding of the genetic causes and have developed tools to help breeders identify at-risk dogs. As a result the number of dogs affected has been greatly reduced.

Researchers are now using genetic markers to identify a number of inherited diseases in dogs, ranging from cancer to progressive retinal atrophy (PRA). Genetic markers are pieces of genetic material, usually DNA, that can be used to identify different cells in an organism. Knowledge of these markers has led to diagnostic tools that can pinpoint which gene is causing a certain disease. Morris Animal Foundation has been funding research in this area for decades.

Genetic markers in sight

In 1993, Dr. Gustavo Aguirre received his first grant from Morris Animal Foundation and began looking for genetic markers for PRA.

"We were supposed to find markers, but we had no genetic map and no tools to develop a genetic map," says Dr. Aguirre, a veterinary ophthalmologist and geneticist at the School of Veterinary Medicine at the University of Pennsylvania. The team of researchers began making a list of genes that could be involved with the disease. Every year, new genes were added.

"Little did we know that there were more than 200 genes that cause retinal disease in people," Dr. Aguirre says. "Imagine at least that many in dogs."

Dr. Aguirre and collaborators developed a genetic map in 1997 and then created a physical map that led them to find the marker for PRA. By finding the marker, Dr. Aguirre was ultimately able to develop a genetic test to identify which dogs carry the PRA gene. There is still no cure for the disease, but the creation of a genetic test has changed the way dogs are bred and helped reduce PRA's prevalence.

Dogs that are carriers of the disease can and should be bred, says Dr. Aguirre. Otherwise, it can significantly reduce the gene pool and create potential long-term problems for the species, he adds. But that breeding should be done carefully.

"A dog that's a carrier of the disease can be bred to a dog that isn't a carrier, and the puppies will be unaffected by the disease," says Dr. Aguirre. That is the main goal of breeding: not producing any dog affected with a disease, such as PRA, yet maintaining the genetic diversity within a breed.

The results of Dr. Aguirre's research have greatly helped organizations like Seeing Eye Inc., which trains guide dogs. The organization collaborated with the Foundation to fund some of Dr. Aguirre's earlier research on PRA.

Past funding from Morris Animal Foundation has allowed researchers at the University of Pennsylvania to identify the genetic causes for many types of blindness in dogs. From these discoveries DNA-based tests were developed for more than 11 retinal disease genes that are applicable to diseases affecting more than 47 different breeds of dogs.

Marking the spot for diseases

Dog owners can now turn to companies like OptiGen, a New York–based company established to provide DNA- based diagnoses and information about inherited diseases of dogs. OptiGen also offers a free PRA-testing program for pedigreed dogs that a veterinary ophthalmologist diagnoses as being affected by PRA. In addition, the company provides DNA tests for many other diseases common in specific breeds, ranging from neuropathy in Greyhounds to narcolepsy in Labrador Retrievers.

Researchers are working hard to uncover more genetic markers for more canine diseases. With Foundation funding, researchers at Cornell University are currently developing new tests for two genetically related disorders that cause abnormal liver function in small purebred terriers. The researchers hope to identify genetic markers for these disorders and then use the markers to develop a test for detecting at-risk dogs.

Scientists at Texas A&M University are looking for the genetic marker for hypertriglyceridemia, a condition that affects Miniature Schnauzers and occurs when a dog has high levels of triglycerides, which are fatty molecules in the blood that appear to be linked to several serious health problems, including insulin resistance, liver disease, pancreatitis and eye disorders.

Dr. Matthew Breen, a researcher at North Carolina State University, former member of one of the Foundation's scientific advisory boards and now a canine cancer adviser, says genetic markers are also being used to break new ground with cancer research, from predicting which dogs will be diagnosed with cancer to developing the best treatments.

"We are also looking closely at the changes to genome organization that occur in cancer cells," says Dr. Breen. "Already we have started to identify changes that are associated with subtypes of cancers and changes associated with response to therapy, which allows us to provide new information to the clinicians about duration of remission."
These advances are leading veterinarians to appropriate treatment options and are helping develop new targets for therapy. The results of canine cancer research may have a far- reaching impact, says Dr. Breen.
"A major positive side effect of working with dogs is that we are also able to use the data to translate to human cancers, and so by helping our dogs, we are also helping ourselves," Dr. Breen says. "I predict that over the next five to 10 years we will learn more about the intricacies of cancer by studying our dogs than by studying people. Man and his best friend, side by side on the path to fighting cancer."

Posted by MAF on August 24, 2011.
Categories: Animal health, Dog health, Veterinary research

U.C. Davis is looking for DNA from affected dogs with sebaceous adenitis, for their study to determine whether the risk of this in Standard Poodles is associated with a specific DLA class II genotype. Note, this is not something we believe TFT's have, but just in case someone has had it occur, the request is being passed along. For additional information about this study, please respond to the following link: http://www.vetmed.ucdavis.edu/ccah/research/poodle_club.cfm

Connie
Health Chair

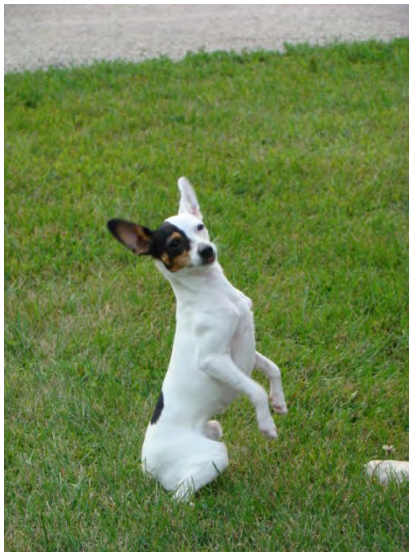
If you want your email published on the Website please send your request to the Secretary:

Dorothy Kendall, 421 Daisey Rd., Clayton, De 19938.

(You can cut this out and send to Dorothy along with your current email address)

Top 5 AKC Agility Toy Fox Terriers are Invitational Bound

December 17 and 18, 2011 will set the stage for the AKC Agility Invitational's at the Orange County Convention Center in Orlando, FL. These top 5 dogs have been out showing the public what the Toy Fox Terrier can be in the performance ring. With a combined total of 18 MACH (Master Agility Champion) titles proving our breed may be small but very competitive on an agility course, from our youngest of the group, Cookie at 3 yrs old to our oldest Juliette at 10 yrs old. This year the Top 5 dogs invited to represent our wonderful breed are sure to prove only one thing, this breed ROCKS! Representing the breed will be: NAC MACH6 Rosen hill's Blink of an Eye Blink aka Blink, from day one, has always been a joy to train. He and I learned how to do agility together, and he has never quit on me even when I made all the mistakes that everyone makes with their first dog. He will always have that most special place in my heart. Blink is owned and handled by Johanna Ammertorp.



MACH 3 Valadon's One Tough Cookie
Cookie is my little challenge. She loves agility, but she also loves to sniff. Still, she got her first MACH at just a month after her second birthday! She has taught me a lot about how to motivate and reinforce the love for agility in order to keep her attention on the course. She continues to improve and has just earned her third MACH with qualifying times right behind her brother! She's a fun little dog! Cookie is owned and handled by Johanna Ammertorp.

In September, 2006, Keegan ~ MACH3 Shivleys Small Fiery One, RN NF and I entered our first AKC agility trial. We were both new to agility but I was becoming addicted to the sport and Keegan seemed to enjoy it as well. Although I felt it was impossible, I started setting a goal to obtain a MACH with Keegan. In September 2008 we received an invitation to the AKC agility Invitational. In 2010 Keegan finished 3rd Cumulative after 4 clean rounds of competition; therefore, was able to compete in the Finals. He placed 6th in finals and I was over the moon! This year will be our 4th and final trip to the AKC agility Invitational.

Our agility journey has included its share of challenges. Keegan started late because of a fractured leg at 8 months old. He also taught me a lot about training as he seemed to have struggles with every obstacle except jumps. We finally got it all together and in January 2010 he finished his MACH, then in August 2010 he finished MACH2 and finished MACH3 in March 2011. At that point we decided to change focus and we started playing another venue, US-DAA. Keegan is owned and handled by Cheryl Morris.

Jynx is a 6 year old Toy Fox Terrier who has been competing in agility since he was two. However, just before his 4th birthday he started occasionally limping and holding up his right leg. Specialists at Cornell University discovered a tumor wrapped around a tendon in his leg. The recommendation was to amputate the leg because the tendon had to be removed with the tumor. Instead, we opted for experimental surgery which spliced the two remaining tendons and then joined the parts together to simulate a third tendon. This had never been done before, and there were no guarantees. They did not think he would be able to do agility again and would have a severe limp. However, after extensive therapy and rehab, Jynx was able to return to agility just over a year later. Now competing for just a year since surgery, Jynx earned his MACH on March 31st and his MACH2 on October 23rd – only 12 trials later! Jynx has qualified for Nationals and made it to the Invitational. Jynx is proudly owned and loved by Jacqui O'Neill, an AKC agility judge.

Juliette ~ MACH 5 Juliette's Butterfly Kisses, UD RE XF AXP AJP is my Novice A everything. We began our team work together in obedience. In February 2007, Juliette became the first TFT to earn a UD (Utility Dog) with AKC. We quickly turned our sights on agility, basically to promote motivation and drive in the obedience ring.

Juliette was a "Velcro" dog, making my new found love of agility near impossible to train and/or compete. Agility dogs need to work independently at times. Through it all I was bound and determined she would learn to love agility. December 27, 2008 Juliette earned her first MACH Juliette and I went on to become a GREAT team together. In 2009, she qualified and attended the AKC Agility National which was held in Concord, NC and has qualified every year since. December 18, 2009 she earned MACH 2, October 31, 2010 ~ MACH3, March 20, 2011~ MACH 4 and August 14, 2011 ~MACH 5. Once a dog that was scared to leave my side, to a dog that earned 3 MACH's in 10 months.

Juliette has been invited to the AKC Agility Invitational 2009, 2010 and 2011. This will be our first year attending and our last. Juliette turned 10 yrs old November 1. She is now running in the preferred jump height group of 4". Our plan as a team is to continue to be the best we can be. This little girl still has a lot of live left in her. Retirement is still years away. With a lot of patience and a team that respects each other… the impossible can become the possible. To infinity and beyond!!!!!! Juliette is owned and handled by Kathy Marble-Brown.

Good Luck to my friends and canine partners as we venture on a journey of a lifetime.

May the Q's be with each any every TFT at the Agility Invitationals!
Kathy Marble-Brown/Performance Chair

Prevalence of owner-reported behaviours in dogs separated from the litter at two different ages

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The present study examined the prevalence of behaviours in dogs separated from the litter for adoption at different ages. Seventy adult dogs separated from their dam and littermates and adopted between the ages of 30 and 40 days were compared with 70 adult dogs that had been taken from the litter for adoption at two months. Owners were asked to complete a questionnaire eliciting information on whether their dog exhibited potentially problematic behaviours when in its usual environment. Binary logistic regression analysis was performed to investigate whether the age at which the dog was separated from the litter might predispose it to developing undesirable behaviours. The odds of displaying destructiveness, excessive barking, fearfulness on walks, reactivity to noises, toy possessiveness, food possessiveness and attention-seeking were significantly greater for the dogs that had been removed from the litter earlier during the socialisation period. In addition, dogs purchased from a pet shop at 30 to 40 days of age were reported to exhibit some of the listed behaviours with a significantly higher frequency than dogs purchased from a pet shop at two months. No significant differences were observed with dogs obtained from other types of sources. The dogs in the youngest age group (18 to 36 months) had a higher probability of displaying destructiveness and tail chasing. These findings indicate that, compared with dogs that remained with their social group for 60 days, dogs that had been separated from the litter earlier were more likely to exhibit potentially problematic behaviours, especially if they came from a pet shop.

EVIDENCE exists of a genetic component for conditions such as anxiety/fear, noise phobia, impulse/control aggression, nonspecific aggression, predatory aggression and obsessive-compulsive disorder in dogs (Beaver 1981, Overall 1994, 2005, Overall and Dunham 2002).

Although these conditions may appear at between one and two years of age, the social maturity period when neural systems are undergoing extensive developmental changes (Overall and others 2006), signs of fear in puppies may become evident as early as three months of age (Dykman and others 1979).

Nevertheless, according to Plomin and Asbury (2005), it is the cross-talk between genetics, environment and experience that contributes importantly to the development of most aspects of behaviour.

The combination of these factors, which operate in a transactional fashion over time, may affect the physiology and behaviour of puppies, having Neuroendocrine, behavioural or epigenetic consequences that may persist throughout life. Previous studies have provided evidence that adverse early life experiences may have a negative impact on behaviour later in life (De Bellis and others 1999, Rinne and others 2000, Heim and Nemeroff 2001). However, understanding of the pathways and mechanisms underlying such influence is limited, and surprisingly little is known about the relationship between behavioural problems and a dog's early experience (Appleby and others 2002). The exposure to environmental stimuli is fundamental in regulating individual responses. It is generally accepted that dogs go through a sensitive period, the socialisation period, during which social experiences and stimuli have a greater effect on the development of their temperament and behaviour than if they occur in later life (Serpell and Jagoe 1995, Overall 1997). The timing of this period is frequently cited in literature to range between the end of the neonatal period, at two-and-a-half to three weeks, to some time between 12 and14 weeks (Freedman and others

1961, Fox 1978). However, Webster (1997) suggested that the effective period may be significantly shorter.

Many social and behavioural deficits observed in adult dogs may be affected by removing puppies too early from the dam and littermates. Although ample anecdotal reports and case histories reveal very pronounced behavioural sequelae resulting from such treatment, scientific studies are lacking. Accurate information regarding the incidence of behaviour problems displayed by dogs separated from the litter early is sorely missing and there is still much to be learned about the processes responsible for the development of problem behaviours following early separation.

Moreover, the combination of early removal plus genetic background may exert an epigenetic effect that differentially operates and which no one has considered. In the present study, the authors collected information on the prevalence of owner-assessed potentially problematic behaviours exhibited by young and adult dogs that had been separated from the dam and littermates when they were either 60 days old or younger (30 to 40 days). The objective of the present study was to evaluate whether and how separation of puppies from the litter early during the socialisation period could predispose them to potentially misbehave as adults.

Materials and methods

Subjects

Data were collected on 140 dogs of either sex, aged 18 months to 7 years old at the time of the study. They were divided into two groups:
ES (early separation, n=70), the group of dogs that were separated from their litter and adopted between the age of 30 and 40 days,
and NES (non-early
separation, n=70), the group including dogs that were separated from the litter and adopted at 60 days of age.

Questionnaire

All owners were telephoned by the same investigator and asked to answer a questionnaire divided into two sections. Owners were recruited via veterinary practices in the geographical area of Naples (Italy). In order to limit a priori confounding variables only clinically healthy animals were included, none of which experienced the potential trauma and additional effects of a shelter environment. The participants had acquired their dog through a breeder, pet shop or from a friend or relative.

Section 1 – animal characteristics

Information about sex (male or female), sexual status (neutered or entire), breed (mixed or pure breed), age (<36 months, >36 months), size (small [<10 kg], medium [10 to 25 kg], large [>25 kg]) and source (official breeder, pet shop, friend/relative) of the dogs was collected.

Section 2 – list of behaviours

Within this section, 16 common types of potentially undesirable behaviour were listed: destructiveness, excessive barking, fearfulness on walks, reactivity to noises, toy possessiveness, food possessiveness, attention-seeking, aversion to strangers, stranger-directed aggression, owner-directed aggression, play biting, tail chasing, paw licking, shadow staring, pica and house soiling. A brief explanation was provided describing the sorts of behavioural signs involved in each behaviour (Table 1). Behaviour definitions were formulated on the basis of a literature review (Brown and others 1987, Seksel 1998, Reisner 2003, Overall 2005, Limura and others 2007, Sherman and Mills 2008, Beaver 2009, De Keuster and Jung 2009, Palestrini 2009). Participants were required to indicate whether or not their dog had exhibited any of these behaviours in their presence. The response option was yes or no.

Statistical analysis

Statistical analyses were performed with SPSS version 18.0 (SPSS). Descriptive statistics were derived from 2 x 2 contingency tables using Pearson's chi-squared tests to study the overall frequency distribution of animals' characteristics in the observed sample (Pearson's chisquared goodness of fit test) and to compare animals' characteristics in the two examined groups (Pearson's chi-squared test of independence). The Fisher's exact test was performed in the analysis of contingency tables when the expected

frequency of the observations was lower than 5. The prevalence of the behaviours exhibited by the respondents' dogs was analysed for significance using a one-sample chi-squared test. The prevalence of behaviour problems was analysed by Pearson's chi-squared test of independence to examine statistically significant differences between the ES and NES group. Also, Pearson's chi-squared test of independence was used to explore differences between the ES and NES group in the exhibition of behaviours with respect to the dog's source. Backward stepwise logistic regression analyses were performed to identify factors influencing behaviours for which there were significant group differences. All variables (age at the time of survey, size group, sex, neuter status, source and breed) were entered into the model initially, with the least significant variables removed one at a time until only significant variables associated with values of $P \leq 0.05$ remained. The significance of each predictor was assessed with likelihood-ratio tests. If appropriate, binary logistic regression was also used to analyse behaviours for which the chi-squared test did not find a significant relationship with the timing of separation. The odds ratio was calculated to evaluate the strength of such relationship. The Hosmer-Lemeshow test was used to assess the goodness of fit of the logistic regression models. A two-sided $P<0.05$ was considered statistically significant.

Results

Section 1 – animal characteristics

Table 2 gives the descriptive statistics of the age, sex, neuter status, size, source and breed of the participants' dogs. The dogs were homogeneous in terms of size, but significantly more dogs were female (58.6 per cent), older than 36 months (62.9 per cent) and of mixedbreed (66.4 per cent). Moreover, significantly more dogs came from a pet shop (50 per cent) rather than from a friend/relative (33 per cent) or a breeder (16 per cent). In addition, only five males of 58 were neutered, while the proportions of neutered and entire females were similar. Animals were equally distributed between the ES and NES group with respect to most of these characteristics. Significant differences were found only in the breed and source: more dogs in the NES group were purebred dogs (67.1 per cent); dogs in the ES group were 100 per cent mixed breed and no dog was sold through official breeders.

Section 2 – behaviour evaluation

The prevalence of behaviours among all the dogs under study is presented in Fig 1. One-sample chi-squared analysis revealed a significant difference in the prevalence of the behavioural categories about which owners were questioned. Attention-seeking ($P<0.05$) and reactivity to noises ($P<0.05$) were the most frequently reported behaviours occurring in 67.9 and 60 per cent of the dogs, respectively. A statistically significant association with early separation from the litter was found for most of the listed behaviours (Table 3). Compared with NES animals, with the exception of four behavioural categories (pica, ownerdirected aggression, paw licking and shadow staring), a significantly larger proportion of dogs in the ES group were reported to display potentially problematic behaviours. A significantly greater proportion of owners of pet shop dogs belonging to the ES group answered 'yes' with respect to the presence of toy possessiveness, fearfulness on walks, attention-seeking, aversion to strangers, excessive barking, destructiveness and play biting (Table 4) compared with owners of pet shop dogs in the NES group. Behaviours that had been shown to be sensitive to group differences were further examined in binary logistic regression models, including the group, age, sex, neuter status, size, source and breed as predictor factors. The results from the logistic regression analyses are summarised in Table 5. As indicated by the Hosmer-Lemeshow tests, the overall fit of the model was good. 'Group' was the only significant predictor for excessive barking, fearfulness on walks, reactivity to noises, toy possessiveness, food possessiveness and attention-seeking. The effect of group was also robust and significant for destructiveness. As shown by the Exp(B) coefficient in the logistic regression, dogs in the ES group were significantly more likely to exhibit the above-mentioned behaviours than dogs in the NES group.

The dogs' age emerged as a significantly robust predictor of two of the listed problem behaviours. In particular, dogs younger than 36 months were

TABLE 1: List of behaviours and definitions used in the study

Canine behaviour	Description
Destructiveness	Destructive chewing of objects that occurs in your presence
Excessive barking	The dog barks frequently and persistently in your presence
Fearfulness of walk	The dog shows behavioural signs of fear (panting, dilated pupils, hypervigilance, flattened posture, shyness, avoidance, flight/freeze, trembling, lip-licking, swallowing, salivation, vocalisation, pilo erection etc) during walks
Reactivity to noises	The dog shows behavioural signs of fear (panting, pacing, restlessness, hypervigilance, inappe tence, trembling, eliminating, hiding, cowering, 'being jumpy') in response to noises such as fire works, thunderstorms, gunshots or any other sort of loud and sudden noises
Toy possessiveness	The dog engages in a competitive dispute over objects (toys, bones or any stolen object) with fam ily members. The situation is characterised by aggressive signalling: any combination of growling, lip lifting, teeth showing, staring, threatening posture, snapping and biting
Food possessiveness	The dog engages in a competitive dispute over food resources (food bowl or treats) with family members. The situation is characterised by aggressive signalling: any combination of growling, lip lifting, teeth showing, staring, threatening posture, snapping and biting
Attention-seeking	The dog seeks attention and physical contact from you (or other members of the household): nuz zles or paws you for attention when you are sitting down, jumps up on you, asks to be petted
Aversion to strangers	The dog shows avoidance behaviours, including any combination of lunging, snarling, growling, baring teeth and withdrawing from unfamiliar people
Stranger aggression	The dog shows approach behaviours directed in an agonistic way toward unfamiliar people, in cluding any combination of lunging, snarling, growling, baring teeth, snapping and biting
Owner aggression	The dog shows approach behaviours directed toward you (or other familiar people) including any combination of lunging, snarling, growling, baring teeth, snapping and biting
Play biting	The dog bites playfully, with a great deal of jaw pressure or any over exuberant use of the mouth in rough play
Tail chasing	The dog shows repetitive behaviour, expressed as slow-to-rapid circling with attention directed towards its tail
Paw licking	The dog directs excessive licking towards its paws
Shadow staring	The dog stares intently at shadows
Pica	The dog exhibits consistent ingestion of non-food material
House soiling	The dog urinates and/or defecates in the house

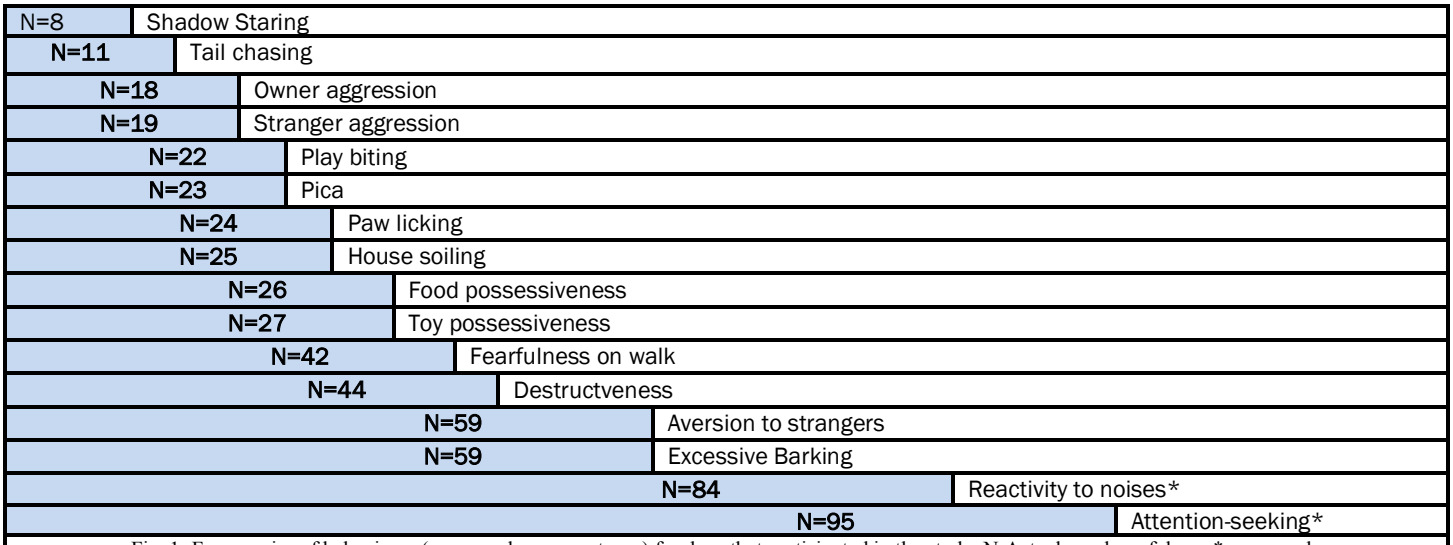

Fig. 1: Frequencies of behaviours (expressed as percentages) for dogs that participated in the study. N Actual number of dogs. *one-sample Pearson's ϰ2 . P<0,05.

TABLE 2: The total number of dogs that participated in the study, according to the group, age at the time of survey, sex, sexual status, size, source and breed

Group					
Dog factor	ES	NES	Total	Pearson's χ2 goodness-of-fit test P	Pearson's χ2 independence P
Age					
<36 Months	23	29	52	0.002 –	
>36 Months	7	41	88		
Sex					
F	44	38	82	0.043 –	
M	26	32	58		
Sexual status					
Entire					
M	26	27	53 – –		
F	18	21	39		
Neutered					
M	0 5	5			
F	26	17	43		
Size					
L	15	28	43 – –		
M	33	25	58		
S	22	17	39		
Source					
Pet shop	42	29	71	0.000	
Friend/relative	28	19	47		
Breeder	0	22	22		0.000
Breed					
Mixed	70	23	93	0.000	0.000
Pure	0	47	47		

Pearson's χ2 goodness-of-fit test used to analyse the frequency distribution of animals' characteristics in the sample of dogs. Pearson's χ2 test of independence performed to compare animals' characteristics in the two groups
Significance: P<0.05.
Group: ES Early separation, NES Non-early separation
Sex and sexual status: F Female, M Male
Size: L Large, M Medium, S Small

significantly more likely to display destructiveness and tail chasing than older animals. Sex, neuter status, size, source and breed were not predictive. No significant relationships were found between the predictor factors included in the regression models and behaviours for which there were no significant group differences (data missing).

Discussion

The results of the present study indicate that early separation of a puppy from the litter is an experience that may increase the animal's chances of showing potentially problematic behaviours as an adult. Moreover, this effect can be further potentiated by the puppy's very first environment. It is well known that experience, genetics and environment jointly influence most aspects of behaviour, exerting interactive effects (Gottesman and Hanson 2005). In dogs, as in human beings, the socialisation period is associated with the development of social and environmental behaviour patterns, including those associated with learning. This type of learning has been described in the context of sensitive or critical periods – the phases of development when the brain is especially sensitive to modification by experience (Casey 2003). Early experiences, such as rearing

TABLE 3: Group differences in the exhibition of problem behaviours from the list provided to owners

Problem behaviour	Yes	No	Total	Pearson χ^2a	Significance (two-sided)
Destructiveness					
ES	33	37	70	14.616	0.000
NES	11	59	70		
Excessive barking					
ES	44	26	70	22.967	0.000
NES	15	55	70		
Fearfulness on walks					
ES	37	33	70	32.687	0.000
NES	5	65	7 0		
Reactivity to noises					
ES	57	13	70	25.030	0.000
NES	27	43	0		
Toy possessiveness					
ES	24	46	70	18.355	0.000
NES	3	67	70		
Food possessiveness					
ES	21	49	70	10.628	0.001
NES	5	65	70		
Attention-seeking					
ES	61	9	70	22.138	0.000
NES	34	36	70		
Aversion to strangers					
ES	42	28	70	16.874	0.000
NES	17	53	70		
Stranger aggression					
ES	16	54	70	8.769	0.003
NES	3	67	70		
Owner aggression					
ES	12	58	70	1.594	0.207
NES	6	64	70		
Play biting					
ES	20	50	70	15.586	0.000
NES	2	68	70		
Tail chasing					
ES	10	60	70	6.314	0.012
NES	1	69	70		
Paw licking					
ES	17	53	70	4.073	0.44
NES	7	63	70		
Shadow staring					
ES	7	63	70	3.314	0.069
NES	1	69	70		
Pica					
ES	16	54	70	3.330	0.68
NES	7	63	70		
House soiling					
ES	18	52	70	4.870	0.027
NES	7	63	70		

aPearson's χ^2 with Yates' correction for continuity, P<0.05
ES Early separation group, NES Non-early separation group

TABLE 4: Differences between groups in the proportion of pet shop dogs' owners who answered 'yes' when questioned for the listed behaviours

Behaviour	Yes answers Number	%	Pearson χ^2a	Asymptomatic significance (two-sided)
Destructiveness				
ES	20	80	5.672	0.017
NES	5	20		
Total	25	100		
Excessive barking				
ES	25	78	7.306	0.007
NES	7	22		
Total	32	100		
Toy possessiveness				
ES	16	100	12.163	0.000
NES	0	0		
Total	16	100		
Fearfulness on walks				
ES	20	91	11.467	0.001
NES	2	9		
Total	22	100		
Attention-seeking				
ES	37	71	9.797	0.002
NES	15	29		
Total	52	100		
Aversion to strangers				
ES	24	80	7.908	0.005
NES	6	20		
Total				
Play biting				
ES	13	87	4.601	0.032
NES	2	13		
Total 1	5	100		

Only behaviours for which a statistically significant difference emerged are reported
aPearson's χ^2 test of independence, P<0.05
ES Early separation group, NES Non-early separation group

condition, can have a profound impact, both positive and negative, on the developing organism. Much of what is learned during the sensitive period results in stimulus-specific and long-lasting behavioural changes, potentially providing a foundation for many adult behaviour patterns and problems (Fox 1978, Godbout and others 2007), aversions, social responsiveness (Scott 1958), patterns of active and passive agonistic behaviour (Fox 1966), general activity levels (Wright 1983), reactions to separation (Pettijohn 1977), approach avoidance patterns (Fox 1966), the development of social hierarchical relationships (Scott and Fuller 1965), anxiety (Ramos and Mills

2009) and functional fear responses (Melzack and Scott 1957). A paper by McEwen (1995) emphasises the significance and lasting effects of early experiences on the developing system in potentially detrimental ways. McEwen argues that the child's early life has profound effects on physical as well as mental health, and argues that unstable parent-child relationships can lead to behavioural disorders later in life. This position is largely grounded in animal models of maternal-infant interaction, and the timing of experiences appear to be key for defining times in development for intervening to prevent or reverse the effects of adverse early life experiences.

Direct interactions with specific stimuli during sensitive phases shape subsequent encounters with these stimuli, influencing the animal's responses later in life. If puppies stay with their dam and siblings during the socialisation period, they have the opportunity to learn from them about behaviours that are attendant with social development during this time (Overall 1997, Pageat 1998, Gaultier 2001). According to the primate model of secure attachment (Bowlby 1958), the mother provides the 'secure base' from which the infant learns to explore its world and acquires confidence and stability in its relationships. These ideas parallel those pertaining to canine behavioural development and related problematic behaviours. During the socialisation period, puppies are normally exposed to novel environmental stimuli within the context of the guidance and reassuring presence of their dam. From about three weeks of age, puppies become extremely distressed if they are placed in a strange situation without their dam, littermates and nest sites (Elliot and Scott 1961). A lack of a known, secure social group may have predisposed the dogs in the ES group to exhibit avoidant and fearful behaviours. In particular, ES dogs were 15 times more likely to exhibit fearfulness on walks, seven times more likely to exhibit attention-seeking and reactivity to noises and six times more likely to exhibit excessive barking than dogs that remained with their litters until 60 days. The chance of a dog developing a behaviour problem has been reported to be dependent upon a number of factors including its breed, age, sex, source and relationship with the owner (Jagoe 1994, Serpell and Jagoe 1995).

In the present study, the sex, neuter status, size, source and breed of the dogs were not significantly associated with reports of the listed behaviour problems. The dog's age was associated with two reported behaviours in the list: animals younger than 36 months were more likely to exhibit destructiveness and tail chasing than older dogs, suggesting that these could be normal developmental behaviours or were associated with environmental stimulation and management. Although the authors did not find any breed predisposition for the list of complaints surveyed, only a general screening of dogs was performed for influence of breed on behaviour, classifying the animals as mixed or pure breed. More detailed and rigorous analyses should be undertaken to demonstrate any existence of at-risk canine breeds.

The source of the dog was not significantly associated with the behavioural categories examined and was not a predictive factor. However, a significantly higher proportion of dogs purchased from pet shops that showed destructiveness, excessive barking, toy possessiveness, fearfulness on walks, attention-seeking, play biting and aversion to strangers was found in the ES group compared with the NES group. All of these animals were mixed breed. Serpell and Jagoe (1995) stated that the source of the dog can be related to the development of some canine behaviour problems. The authors found that behavioural problems were more likely to occur in dogs obtained from shelters or pet shops, as well as in stray dogs, than in dogs purchased from breeders, friends or relatives or in those that were home bred. According to Bennet and Rohlf (2007), perhaps 'pet shop' puppies are less adequately socialised than other puppies, they come from less careful selections or the experience of being in a pet shop has lasting effects. Moreover, it might also be the case that people who buy puppies from pet shops, like those who buy crossbred rather than purebred dogs, may devote less time to training than other owners, or such people may simply report more potentially problematic behaviours than others do, independently of the dog's actual behaviour. As suggested by the above-mentioned authors, these possibilities clearly need to be further investigated as, if dogs purchased from pet shops do consistently display more potentially

problematic behaviours, this issue should be addressed. Of course, there is another option: pet stores may obtain their puppies from so-called 'puppy mills' or 'puppy factories', that are high-volume, substandard dog-breeding operations, which sell purebred or mixed-breed dogs and where very little care is taken to promote optimal breeding practises and animal welfare. Unfortunately, the authors were not able to obtain reliable information on such aspects and we cannot exclude the possibility that some of the pet shop dogs in the ES group came from a puppy farm. In any case, in light of the above considerations, in the present findings, the authors can clearly recognise how behaviours are best accounted for by the interplay among early experiences, environment and heredity.

It has to be noted that in order to guide the participants, they were provided with a brief definition of each behaviour included in the list. In addition, whenever necessary, additional information and guidance was provided by the investigator. Despite that, the present study required owners to interpret fearfulness, possessiveness, aggressiveness and other behaviour patterns. Although the use of the owner as an informant allows the rapid acquisition of data on a large number of animals, it still needs to be shown that this method is scientifically precise and reliable (Martin and Bateson 1993).

Accordingly, the present findings should be interpreted conservatively and must be regarded as a first step in the assessment of whether early separation is a problematic husbandry strategy.

Demonstration of a mechanistic link between early separation of a puppy from the litter and the development of laws against irresponsible marketing of .

TABLE 5: Logistic regression models predicting problem behaviours from the list provided to owners

Problem behaviour	Significance	95% CI for EXP(B) EXP(B)	Lower	Upper	Hosmer-Lemeshow significance test
Destructiveness					
ES	0.025	2.434	0.848	6.986	0.444
Age (<36 months)	0.009	3.044	1.321	7.015	
Excessive barking					
ES	0.000	6.208	2.934	13.123	0.572
Fearfulness on walks					
ES	0.000	14.576	5.237	40.565	0.957
Reactivity to noises					
ES	0.000	6.983	3.230	15.097	0.407
Toy possessiveness					
ES	0.004	1.128	1.373	92.759	0.311
Food possessiveness					
ES	0.002	5.714	1.543	16.9807	0.209
Attention-seeking					
ES	0.000	7.176	3.091	16.662	0.132
Tail chasing					
Age (<36 months)	0.015	6.067	1.338	27.515	0.115

Age: this indicates the age of dogs at time of survey. Only behaviours for which a statistically significant difference emerged are reported. Significance, P<0.05
EXP(B) Exponentiation of the B coefficient (odds ratio)
CI Confidence interval, ES Early separation

poorly bred and behaviourally compromised animals. This effort would also raise public awareness about the validated problem behaviours in the adult would reduce the prevalence of prematurely adopted dogs and allow intervention for those who have been adopted too early. If veterinarians educate the public about responsible dog ownership and the problems attendant with premature adoption, this may strengthen and encourage enforcement of animal control value of behavioural treatment and intervention. Because behaviour problems can be a huge source of distress for owners, veterinarians should be prepared to offer advice and provide information to owners to prevent damage to the human-pet relationship, which may cause dogs to be relinquished to shelters (Patronek and others 1996, Campbell 1999, Segurson and others 2005). The knowledge that early separation from the litter exerts influence on specific and problematic behavioural patterns in dogs might provide information that will improve behavioural intervention for owners of early separated puppies.

In conclusion, early separation from the dam and littermates, especially when combined with housing in a pet shop, might affect the capacity of a puppy to adapt to new environmental conditions and social relationships later in life. Based on this information, behavioural intervention can address the development of problem behaviours and improve the dog's relationship with the owners, ultimately reducing the number of dogs that are relinquished or abandoned.

(A list of references can be found at the Journal of the British Veterinary Association)

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