

## **FELINE HOUSEOILING**

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Feline Inappropriate Elimination (F.I.E.) or feline house soiling is probably the most common behavioral problem of cats and the most annoying to our clients. Owner's expectation that cats will eliminate in the litter box is one of the reasons they are popular pets. F.I.E. is the most common behavioral problem seen by behaviorists<sup>1,2</sup> F.I.E. is the urination or defecation by the cat outside of the litter box on horizontal or vertical surfaces and includes marking (spraying) behaviors. Elimination problems in cats may be difficult to diagnose and treat especially if long standing non-litter box usage has occurred. Elimination problems in cats are associated with an increased risk of relinquishment of cats to humane shelters in the United States.<sup>3</sup>

Medical problems can exacerbate and complicate problem elimination behaviors in cats. Therefore, when dealing with feline elimination behavior problems, medical problems must be vigorously ruled out. All cats should be checked for any concurrent medical condition that could be contributing to the inappropriate elimination. A urinalysis via cystocentesis is preferred for examination of urine samples. Physical examinations and appropriate laboratory testing are essential when diagnosing and treating elimination problems in cats. In some cases it may be appropriate to perform other screening tests such as radiography, urine cultures or ultrasound examinations. Inappropriate elimination can also be a symptom of other medical abnormalities, such as hyperthyroidism, diabetes mellitus, liver disease, inflammatory bowel disease, constipation, and neurological diseases. Constipation, colitis, inflammatory bowel syndrome, food allergies and neurological deficits can all contribute to inappropriate defecation in the cat. In addition, elderly animals may have changes in physical abilities (arthritis, visual or olfactory changes) and conditions (senility) that may change litter use patterns. Medical and behavioral causes can occur concurrently and make treating each one a challenge. In a retrospective study comparing cats with elimination problems to cats without elimination problems, problem cats were more likely to have a history of LUTD<sup>4</sup>.

### **HISTORY TAKING FOR HOUSEOILING**

A thorough behavioral history is essential for diagnosis and treatment of problem elimination behavior. The goal of the behavioral history is to determine what is going on, where the elimination takes place, who is eliminating if there are multiple cats in the home and the underlying motivation for the problem behavior. The following points should be discussed during the history taking process:

- Inquire about a 24hr. day, how they feed, play with and interact with the cat on a daily basis. Any changes such as roommates, job hours, moving or a new baby in the house.
- The duration and progression of the problem behavior.
- A complete understanding of litter box usage.
  - Does the cat use the litter box at all? Are both urine and stool occurring outside the box.
  - Is the elimination found on horizontal or vertical surfaces?
  - How large is the urine spot? Large amounts of urine deposited on horizontal surfaces usually indicate that the cat is emptying the bladder. Conversely, small amounts of urine on horizontal surfaces may indicate marking behavior.
  - For defecation note the frequency and consistency of fecal material.
  - How does the cat use the litter box? Does the cat bury urine and stool? Is there much digging and scratching in and around the litter box?
  - Did the cat ever have a consistent pattern of litter usage?

- Is this a new behavior, or a chronic one?
- Litter box information.
  - Type of litter material provided to the cat.
  - Any recent change in litter material type. A retrospective study of feline inappropriate elimination behavior cases revealed 68% of the cats had scented litter in their boxes while only 25% of control cats were provided with scented litter<sup>4</sup>.
  - Litter maintenance routine. How often is the litter material changed, how is the box cleaned, and what is used to clean out the pan? Litter cleanliness is often a factor in non-litter box usage or abrupt changes in litter type may precipitate housesoiling<sup>1</sup>.
  - Type of litter pan, covered, uncovered and size of the pan.
  - Location of litter pan, placement of litter pans may influence location aversion or preference. Have the owners recently changed the litter pan location?
  - Number of litter pans available in multi-cat homes.
- Problem elimination behavior.
  - Have the owner provide a diagram of the locations of inappropriate elimination.
  - How many spots are in a given room and what is the location of the elimination.
  - Is the urine located on the floor or on the walls?
  - What substrate (material) does the cat eliminate on. Are there different substrates for urine and stool?
  - Ascertain if it is urination (elimination on horizontal surfaces), spraying (urination on vertical surfaces), and defecation outside of the litter box, or a combination of elimination types.
  - The frequency of urination or defecation outside the litter box ○ Determine when the owners find the elimination outside of the litter box.
- Multiple cat homes.
  - Are other cats also going outside the litter box? In a multiple cat household it may be difficult to determine whom is house soiling without confinement trials. Other methods are detailed in other sources<sup>13</sup>.
  - Inquire about any inter-cat aggression. Questions may need to be very specific asking owners to detail any encounters that encompass growling, swatting, hissing, scratching, chasing and biting. Social issues between cats can often contribute to non-litter box usage. Owners may not be aware of social relationship between household cats that are agonistic. Dominant cats may approach a subordinate with upright ears rotated to the side, limbs extended so that the back has an upward slope from head to tail<sup>6</sup>. Cats may indicate submission by crouching, turning the ears down and avoidance<sup>6</sup>.
  - Additional information about sleeping patterns of the cats in the home, owner interaction with the cats, resting places and food bowls are all important pieces of the behavioral history.
- Punishment and other treatment attempts in the past.
  - Have they ever caught the cat in the behavior and if so what have they done.

- Past treatment attempts and the length of time that each treatment was used.
- If you have not seen this patient before, be sure to question about any previous history of urinary tract disorders and diagnostic tests performed.

If possible, you may want to try and determine what might have been the initiating factors that resulted in the cat not using the litter box. In other words, do the owners know of a precipitating event that was associated with the beginning of non-litter box usage? However, in long standing cases the owner may not know the answers. It is also important to try and determine the maintenance factors for ongoing behavior. These may not be the same as the initiating factors and need to be explored with the owner. Maintenance factors could be substrate preferences, location preferences, ongoing medical disease and litter or location aversions.

When the behavioral history is not clear, or the information needed for diagnosis is not available, then it is advisable that owners begin keeping journals. Owner journals require that the owner search the house daily for inappropriate elimination. Additionally, the owner needs to check the litter box daily for elimination in that location. Elimination type and location is then noted. This information is then recorded and used to facilitate diagnosis and treatment.

**DIAGNOSIS**

After you take a thorough history evaluate the information that was received. Complete history taking allows enough information to establish a diagnosis.

- Is the inappropriate elimination due to location of the pan, the litter material, or the lack of cleanliness of the litter box?
- Location aversions may manifest in the history as unwillingness to be where the litter box is placed. The history may show a change in the use of the space or lack of privacy in the litter box location.
- Does the pattern of urination show a substrate preference?
- Does the elimination pattern show a location preference?
- Is there reason to suspect a litter aversion?

Cats with litter aversions may perch on the side of the litter box to eliminate or quickly get in and out of the litter box without covering the elimination.

- Has frustration played a major role in the development of the behavior in the form of a new baby, a new home or new pet?
- Are there social conflicts between cats in the home?
- Is it possible that this animal was never adequately litter trained in the first place?
- Factors that initiated the inappropriate elimination may not be the same as those that are maintaining the behavior.

**Diagnostic categories for feline inappropriate elimination:**

- location preference,
- substrate preference,
- litter aversion,
- location aversion
- marking behavior and stress/anxiety motivated behaviors<sup>7</sup>.

The use of a diagnostic category will help in the formulation of a treatment plan.

	<b>LOCATION AVERSION</b>	<b>LITTER AVERSION</b>	<b>SUBSTRATE PREFERENCE</b>	<b>LOCATION PREFERENCE</b>	<b>MARKING</b>
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Site of elimination	Elimination in various sites other than the litter box	Elimination near but not in litter box/perch on litter box edge	Elimination always on same materials	Elimination usually in one spot	Elimination usually on vertical surfaces; Occasionally on horizontal ones
Relations between cats in the same house or cats outside	Possible social conflicts between cats leading to negative association or inability to access	Unlikely to be related to social problems within the house	Unlikely to be related to social problems within the house	Cat restricted to one area due to social conflicts with other cats may lead to location preference	Often related to social conflicts within the house. May also be related to cats outdoors
Use of the litter box	Cat never seen using the litter box	May use litter box for one type of elimination and not other	May use litter box for one type of elimination and not other	May use the litter box some of the time	Usually continues to use the litter box

## TREATMENT

In general treatment will work by manipulating three things; access, attractiveness and aversive.

- Access entails limiting a cat's access to the areas where they have previously soiled. One option is to confine the cat in a small area like a half bath with litter and food at least when no one is home or the owners are sleeping. Confinement is usually only effective in getting the cat to use the litter box while confined, but may not affect the elimination behavior when the cat is free in the house<sup>7</sup>. It is often useful to assess the information in the history about when the owners find the elimination outside of the litter box to determine when it may be most efficacious to confine the cat. Confinement can then be focused on the time frame when elimination outside of the box is usually found. Confinement is used to try and find a litter usage pattern. When the cat is in confinement, have the owners check on the cat and try to ascertain when the cat urinates and defecates. Most cats urinate 1-3 times daily and defecate once. After the cat has eliminated, they most likely will not eliminate again and then the owner can let the cat out under strict supervision. The owner must also record when elimination occurs and what type.
- When the owner is home the cat may be out under strict supervision. This means that the owner must know where the cat is at all times. If the cat leaves the room that they are in they must follow the cat and if the cat looks like it is going to urinate or defecate they should use some form of remote distraction or interruption to stop the behavior. Remote distraction is a distraction that is designed to startle the cat and hopefully the cat will avoid the area. Remote distraction can be in the form of throwing something in the direction of the cat or a noise distraction to startle the cat. At no time should the cat be hit with the object nor should the owner yell at the cat. They want to startle, not injure the cat. When they yell at the cat, then they need to be present to inhibit the behavior. Punishment is the least effective tool in changing elimination behavior. When the pet associates the punishment with the owner, owner avoidance and fear develop and disrupt the pet-owner bond.
- Attractive means to make sure the litter pan is user friendly. Be sure to have the owners totally change the litter material every 3-4 days and scoop out the feces daily. They should also rotate the litter material around to dissipate the wet litter. It may be helpful to encourage clients to go back to using plain clay litter without any odor control granules added. Research has shown that some cats prefer the clumping materials to clay litter products.<sup>8</sup> Cats that are provided clumping type litter materials are usually kept on the same material and the box is scooped daily and changed weekly. Some cats may be particular about the depth of the material in the litter pan so depth of the litter material should be adequate. If the history reveals that the cat digs and pushes the alternate substrate when eliminating, more litter material in the pan may be helpful. For other cats changing some characteristics of the litter pan may be beneficial. This could be removing the cover from a covered litter pan. Owners should be cautioned to use mild smelling soaps when cleaning litter boxes and avoid materials that could be toxic to cats.

When there are multiple cats in the home, the number and placement of litter boxes can be crucial to good litter box usage by all cats in the home. In multiple cat households there should be an adequate number of pans in different locations, not just an increase in the number of pans side by side. It may be necessary to establish multiple core areas for food, litter and resting to allow all cats equal access to important resources<sup>9</sup>. This is especially critical if the history reveals problems in social interactions between household cats. For elderly cats, a litter box may be needed in a more accessible location, especially if mobility is a problem.

If the cat will not use the litter in confinement, or if the history suggests a litter aversion, then it is time to try litter trials<sup>7</sup>. A litter trial consists of offering the cat a choice of litter materials in the confinement spot and recording which material the cat prefers. Sometimes the choice in the second box is based on information in the history suggesting a substrate preference. Allow each new substrate to be used for a minimum of three days and have the owner record which the cat uses and for what type of elimination. If the alternative substrate has not been used in 3 days then stop it and try another. Keep going until it is clear what material the cat prefers. Some cats appear to like one box for urination and one box for defecation. It is also possible for the cat to like one substrate for urination and another for defecation. Another method is to simply provide a litter box cafeteria and see which choices the cat uses.

Another component in treatment is to make sure that the owner has adequately cleaned the areas that the cat previously soiled. There are many good products on the market for cleaning up urine and stool in the home. These include, Outright®, KOE®, Simple Solution® and Natures Miracle®. Bramton and Thornell make an entire line of odor control products that work quite well. When elimination has been present for some time, it may be difficult to remove urine odor without removal of carpet and/or padding material. Furniture that is extremely soiled may not be able to be adequately cleaned to remove all urine odors.

Make the areas where the cat has urinated or defecated aversive or change the usage. Commonly used techniques include food bowls, aluminum foil, plastic, potpourri, mothballs, sticky tape, upside down carpet runners. For cats that are eliminating in bathtubs and sinks, small amounts of water in these places may discourage their use. Access to areas where the cat has soiled can be avoided using closed doors, large pieces of furniture, gates or motion sensors. Changing the area into a feeding station using food bowls or a sleeping or play area may be effective for some cats.

Request that clients call in 7-10 days with a progress report. Most behaviors take between 2-6 weeks to begin to change and that at the end of 2 weeks change may take place indicating that the treatment is on the right track. The success rate varies in direct correlation with the length of time that the behavior has been going on, the number of locations soiled as well as the owner compliance with the treatment plan. Owner journals can help track compliance and progress. The number of eliminations deposited outside the litter box may decrease gradually or quickly, journals help assess progress.

## **MARKING BEHAVIOR**

Spraying and marking cats are handled using the same history taking technique and gathering the same information as obtained in horizontal elimination problems. Cats that mark with urine on vertical surfaces may at other times use the litter box for elimination of both urine and stool. It is important to focus on the location of the urine, the size of the urine spot and possible sources of stress in the household. Marking in cats is often categorized as either sexual or reactional marking behavior<sup>19</sup>. Cats will mark with urine to attract mates and also urine mark in response to environmental changes and/or stress<sup>7</sup>. Although spraying is usually thought to be associated with intact animals, neutered animals will spray. Naturally, if a spraying cat is intact, then neutering is indicated. However, neutering is effective in only 90% of male cats and 95% of female cats, and even animals neutered prior to puberty may mark with urine<sup>10</sup>. When there are multiple cats in the home marking with urine may occur to delineate territory or due the stress. Cats will often mark inside the house as a territorial response to the presence of other cats outside the home. Marking behavior can also occur on horizontal locations and this is often revealed in the history as small amounts of urine deposited in multiple locations.

## **TREATMENT FOR URINE MARKING**

- One of the major components to treatment plan is "alone time". This allows the spraying cat to have access to an area all by him/herself without the presence of the other cats in the household. This can be in the basement or a bedroom, but the cat should have a minimum of 4-6 hours of alone time daily. You can also reverse positions, with the spraying cat having the run of the house and the other cats confined. In other

situations the number of cats in the home may need to be reduced to eliminate or decrease spraying behavior.

- It also helps to make the sprayed areas aversive using tactics mentioned earlier.
- Another strategy that may work is creating an acceptable spraying spot for the cat. Have the owners create an "L" shaped litter arrangement, two litter boxes, one horizontal with litter inside and placed inside one that is empty and vertical<sup>12</sup>. Often times a spraying cat will then just spray in this litter box arrangement. While this has not stopped the spraying behavior, it often is a solution that owners are willing to live with.
- Cats outside of the home.

Attempts should be made to limit the inside cats ability to visualize the outdoor cats<sup>13</sup>. This can be done by blocking visual access out windows and doors or closing the cat in a room where it cannot visualize outside cats. Removal of furniture close to windows and modifying windowsills so the cat cannot sit on them may be helpful. The owner should be discouraged from feeding outside cats and remove bird feeders and other things that might attract additional cats.

- Synthetic pheromone spray or diffuser with Feliway®. Feliway® is synthetic cheek pheromone of cats and can be useful in decreasing or stopping spraying behavior<sup>14</sup>. Developed by Dr. Patrick Pagaet, Feliway® is often effective in decreasing urine spraying caused by reactional stimuli such as changes in the cat's environment (moving, new pets. stress etc.). Pheromone spray has also been used to calm cats in new environments.
- Surgery

Cats that are intact should be neutered. The most commonly suggested additional surgeries for spraying in cats include olfactory tractotomy<sup>15</sup> and bilateral ischiocavernosus myectomy<sup>16</sup>.

## PHARMACOLOGICAL TREATMENTS

When considering drug therapy, a complete behavioral and medical history should be obtained prior to choosing a medication. Veterinarians should be familiar with the indications, contraindications and side effects of the different therapeutic agents. Most drugs used for behavioral problems are not approved for use in dogs and cats, and therefore constitute extra-label usage. Complete serum biochemistry (liver and kidney function tests, CBC and thyroid profiles) and possible cardiac work-ups are indicated prior to use. Owners need to be informed of potential side effects, and that the usage of the drug is extra label. Consent and release forms should be obtained from owners. Some drugs have potential for human abuse: this must also be considered prior to dispensing medications. Frequent client contact for efficacy and side effects of drug therapy are necessary. Owners should plan to be home for the first 1-2 days of treatment to assess their pet for side effects of the medication.

Drug therapy can be a helpful adjunct to behavioral treatment of inappropriate elimination and marking behaviors. Drug therapy alone is rarely curative and is best used in conjunction with behavior therapy. The most commonly used drugs are tricyclic antidepressants, benzodiazepines, buspirone, selective Serotonin reuptake inhibitors and progestins.<sup>17 18 19</sup> Each drug has a different pathway of action and vary in clinical efficacy and side effects. When contemplating drug therapy, it is important to have a behavioral diagnosis, such as spraying, marking, litter aversions etc. If the behavior is not in response to stress, territorial stimuli, or anxiety it is unlikely that drug therapy will be helpful. If the cat is eliminating outside of the litter box because of a litter aversion, litter cleanliness problems, location or substrate preferences, drug therapy will most likely be ineffective. When using drug therapy, the best results will be obtained when concurrent behavioral therapy is instituted.

Buspirone, an anxiolytic and partial serotonin agonist has recently been shown to be more effective than either diazepam or progestins in reducing spraying behavior with a lower reoccurrence rate of spraying when medication was discontinued<sup>18</sup>. Buspirone is commonly dosed at 2.5-5.0 mg per cat every twelve hours. The side effects noted with Buspirone include disorientation and gastrointestinal symptoms and on occasion increased aggression toward other cats or owners and paradoxical excitement. Owners must also be informed of delayed onset of action, possibly taking up to one month to be effective. When Buspirone is discontinued, spraying behavior may return and some cats maintained on low dosages for long periods of time.

Benzodiazepines are GABA synergists and are useful in the treatment of anxieties in humans. Diazepam has been used for spraying and other behavioral problems in cats<sup>19</sup>. Recent reports of irreversible fatal liver failure in cats on diazepam have surfaced.<sup>21 22</sup> Although the number of

affected cats is small, benzodiazepine should not be the drug of first choice. If a decision is made to use a benzodiazepine, owners should be informed and appropriate chemistry screenings performed<sup>22</sup>. The usual dosage for diazepam is 1-2 mg./cat every 12 hours.<sup>23</sup> Side effects of benzodiazepines include mild ataxia, lethargy, and increased appetite. Some animals may experience a paradoxical excitement after benzodiazepine administration. The reoccurrence rate of spraying after benzodiazepines are discontinued can be quite high, up to 90% .

Recently, a small study has shown the efficacy of using Clomipramine for urine spraying in cats<sup>19</sup>. Clomipramine is a tricyclic antidepressant that is a serotonin reuptake blocker. It also has some norepinephrine reuptake blocking effects. Twenty-six cats that were spraying urine in the home were treated serving as their own control with a placebo and then with Clomipramine. Cats were treated with 5 mg. of Clomipramine (total per cat per day) once daily for 7 days, then with a placebo for 3 days. Eighty percent of the treated cats showed reduction in urine spraying of a least 75%. The only side effect noted was sedation. However, because Clomipramine is a tricyclic antidepressant, other side effects of urinary retention, tachycardias, depression and inappetance are possible<sup>24</sup>. Others have suggested treating urine spraying with Clomipramine using 1-5 mg per cat every 12- 24 hours<sup>25</sup>.

In a double-blind placebo-controlled clinical trial, Pryor et al<sup>26</sup> tested the effectiveness of fluoxetine hydrochloride for the treatment of urine marking. Enrolled cats had 2 weeks of baseline recording prior to starting the trial and were entered into the trial if 3 or more urine marks were deposited per week during baseline. In the drug treatment phase each cat received either drug (1.0 mg/kg once daily) or placebo for 8 weeks and their owners recorded urine marks observed. Recording was continued for 4 weeks after discontinuing drug or placebo. Each household was to follow the same environmental plan; use the same cleaner to clean urine marks, have one more litter tray than number of cats in the home, scoop the tray daily and change the litter tray weekly. Cats on medication showed a significant decrease in urine marks when compared to placebo with 6 out of 9 cats on drug showing no urine marking by week 7-8. A correlation was found between marking at baseline and return to marking after the drug was withdrawn.

Progestins have been used extensively in the past for treatment of inappropriate diminalion behaviors in cats. The potential side effects of this class of drugs are numerous. These include diabetes, mammary gland hyperplasia, gynecomastia, adenocarcinoma, endometrial hyperplasia and pyometra, adrenal cortical suppression, and bone marrow suppression<sup>20</sup>. For this reason progestins are not the drug of first choice. Dosages have been listed in other sources.<sup>27</sup> This class of drug might be considered if no response was obtained to other medications.

Recently, research has focused on Interstitial Cystitis as one component of Idiopathic Lower Urinary Tract Disease in cats. Cats are presented with absence of urine pathology and behavioral manifestations of inappropriate elimination. Cystoscopic examination has revealed bladder lesions compatible with Interstitial Cystitis in humans. Currently, treatment is with the tricyclic antidepressant Amitriptyline 2.5-10 mg. once daily at bedtime.<sup>28</sup> Side effects noted with tricyclic antidepressants include tachycardia, gastrointestinal upset, dry mouth, constipation, and urinary retention<sup>24</sup>. Amitriptyline can take 7-30 days to achieve behavioral effects. Amitriptyline has also shown to be effective in urine spraying behaviors as well<sup>27</sup>.

## **PROGNOSIS**

### **Prognosis for inappropriate elimination**

Response to therapy can be quite variable for several reasons. The first is the length of time that the cat has been house soiling. The longer the behavior has been present, the more difficult it is to resolve the problem on a permanent basis. A study of long term follow-up for treatment of elimination problems in cats by Marder and Friedman<sup>29</sup> showed that cats with a problem duration of one month or less had 100% resolution, but only 52% of cats who had problem behaviors with duration greater than one year showed resolution. In the same study success was defined as 75% resolution of the problem and was more likely in cases with urination outside of the litter box. Males showed resolution at a lower rate than females with 52% versus 83% showing improvement. For this reason it is important that every feline examination should include routine questioning about litter usage of the cat. Often the problem behavior starts in a very limited way with only one or two occurrences of house soiling. If treated early, before the behavior is well established the success rate may be higher. When dealing with a long term house soiling case, it is important to let the owner know that it may take time for the problem to resolve and that only a decrease in the frequency of problem behavior may occur, not of the behavior entirely. For example in some cases of long standing inappropriate elimination cats will start to use the litter tray

successfully, only to relapse again. Often, if the original treatment was successful, reinstatement of the previously tried techniques may resolve the problem again, but there is the possibility of relapse later. For these cases an increase in the time between relapses is the goal. Follow-up with owners is important to assess progress. In cases that are resistant to therapy, medical complications such as interstitial cystitis and uroliths may be factors. **Prognosis for marking**

Marking behaviours can also have a variable response to treatment. Factors such as outdoor cats and the ability to control them, household social conflicts with other cats and ongoing household changes may affect total resolution of the spraying behavior. Ogata and Takuchi<sup>30</sup> found that while urine marking decreased with pheromone therapy, urine marking was sustained at a higher level in households with intercat aggression. Mills and Mills<sup>31</sup> found that while urine marking decreased, it often was not eradicated. However, the reduction in spraying behaviour was acceptable to the clients as an outcome. This is similar to what has been found in previous studies on treatment of spraying behavior with medication by Har<sup>27</sup>, marking behaviour may persist or return after treatment with medication is stopped.

Prognosis may be improved in marking behaviours by keeping household stress to a minimum and the scent profile in the home constant. Long term use of pheromone spray or diffuser may also be useful. Additional Reading Horwitz, DF 2002 House soiling by cats In: In: BSAVA Manual of Canine and Feline Behavioural Medicine. Eds: Horwitz, Mills and Heath. BSAVA, Gloucester, UK

#### References:

- <sup>1</sup> Beaver BV.-Housesoiling by Cats: A Retrospective Study of 120 cases". JAAHA 25(6): 631-637; 1989
- : Borchelt PL. Voith VL. "Elimination Behavior Problems in Cats". Compendium. Cont. Ed. 8:197-205; 1986
- <sup>1</sup> Patroneck. GJ, Glickman LT, Beck AM, et al. " Risk factors for relinquishment of cats to an animal shelter" JAVMA. 209:582-588, 1996.
- <sup>4</sup> Horwitz DF., "Behavioral and environmental factors associated with elimination behavior problems in cats: a retrospective study," Applied Animal Behaviour Science , 52 (1997) 129-137.
- <sup>1</sup> Overall KL. "Diagnosing and Treating undesirable Feline Elimination Behavior". Feline Practice Vol 21(2): 11-15. 1993.
- " Crowell-Davis. SL. Barry. K. Wolfe. R "Social behavior and aggressive problems of cats" Veterinary Clinics of North America: Small Animal Practice. Vol. 27:3 May 1997. Pp. 549-568.
- <sup>7</sup> Houpt KA. "Housesoiling: Treatment of a common feline problem" Veterinary Medicine. Vol. 86: 1000-1006. 1991
- <sup>8</sup> Borchelt, PL. "Cat elimination behavior problems," Veterinary Clinics of North America: Small Animal Practice. Vol. 21:2 March 1991 ed.: 254-265.
- <sup>1</sup> Bernstein P. Strack. M. Home Ranges, favored spots, time-sharing patterns, and tail usage by 14 cats in the home. Animal Behavior Consultant Newsletter Vol. 10(3), 1993.
- <sup>1(1)</sup> Hart BL. Barren RE. "Effects of castration on fighting, roaming, and urine spraying in adult male cats". JAVMA. 163:290-292. 1973.
- " Hart BL. Cooper L. "Factors relating to urine spraying an fighting in prepubertally gonadectomized cats" JAVMA. 184: 10;1255-1258, 1984.