

**ASSESSMENT ON THE EFFICACY OF “SKUDO” IN  
ELIMINATING ECTOPARASITES AND ON ITS EFFECTS ON  
DOGS’HEALTH.**

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## **INTRODUCTION.**

Stress is an internal (physiologic or psychogenic) or environmental stimulus that initiates an adaptive change or a stress response in animals. The degree of stress that evokes harmful responses that interfere with the well-being and comfort of an animal is called distress. Distress responses have generally been demonstrated to increase the production of adrenocorticotrophic hormone (ACTH) and beta-endorphin by the adenohipophysis under the control of hypothalamic corticotropin releasing factor (CRH), oxytocin, and vasopressin (VP), resulting in an increased secretion of glucocorticoids by the adrenal cortex (Breazile, 1988).

Increased circulating levels of glucocorticoids have been used as an indicator of the intensity of distress responses in animals. Values for baseline serum hydrocortisone (cortisol) concentration in normal non-stressed dogs range between 0.5 and 6.0 µg/dl (Feldmann & Nelson, 1996).

Arthropod-induced stress in animals has been correlated with animal performance or with the well-being and comfort of an animal. In addition, stress may impact the immune system, which makes the animal more susceptible to certain diseases (Campbell, 1988).

In order to avoid and /or eliminate parasites in animals, many anti-parasite therapies have been tested. Yet, the continued use of anti-parasite products may induce pharmacological resistance of the parasites, reducing the efficacy of the products. Furthermore, such products are often toxic and dangerous both for animals and for people living in direct contact with them.

In consideration of these factors and in order to monitor parasites on domestic animals (cats and dogs), Kem-O-Tek Italia s.r.l. has created “Skudo”.

“Skudo” is an electronic device applied on the animals’collars. The product contains inner microchip emitting a series of pulsed ultrasonic waves, which disturb ectoparasites (such as fleas and ticks) and having a repellent, non-toxic effect on the animal.

Dogs can perceive a wider range of sounds than human beings and may therefore get nervous and excitable in the presence of sound stimuli. Sound waves over 120 decibels may cause panic attacks (Campbell, 1992) and dogs become hyper-excitable when stressed by sudden and loud noises.

Since sound stimuli may cause behaviour problems in dogs, due to the animal’s sensitivity, the present study has the purpose of verifying the effect of ultrasound waves emitted by “Skudo” on dogs’health. Such assessment has been made by monitoring of plasma cortisol levels.

## **PURPOSE**

Aims of this research:

Assess the efficacy of “Skudo” in preventing the reinfestation caused by ectoparasites in dogs after the application of a standard anti-parasite treatment (bath with a shampoo containing pyrethroid).

Verify whether the ultrasonic waves emitted by “Skudo” may represent a stress stimuli affecting the animal’s state of health.

## **MATERIALS AND METHODS**

### **ANIMALS**

Research was carried on 20 healthy adult male dogs of different breeds and ages. The animals were taken to the kennels of the Department of Veterinary Medicine of the State University Paulista (Unesp), Araçatuba Campus, St.Paul, Brazil.

### **EXPERIMENTAL PROCEDURE**

Soon after their arrival at the kennels (1<sup>st</sup> day), they underwent clinical examinations to confirm the presence of ectoparasites (ticks and fleas) on their coat. On the second (2<sup>nd</sup>) day of the experiment, all the dogs were washed with anti-parasite shampoo (Mersey Dog ® brand, at base of pyrethroid) according to the product recommendations. After the shampoo, dogs were divided into two experimental groups (n = 10 per Group):

- (1) the Control Group, which did not undergo any further anti-parasite therapy until the end of the research;
- (2) the Skudo Group, with the “Skudo” device put on the dogs’ collars and there left until the end of the study.

Each group of animals was kept together in the kennels, permitting the mutual contact. The reinfestation was monitored on a weekly basis over 10 weeks, verifying either the presence or the absence of ectoparasites. During the study dogs received food and water rations *ad libitum*.

### **HORMONE LEVEL TEST**

A five (5) ml sample of blood was taken from the cephalic vein daily during the first week of the experiment and, subsequently, once a week until the conclusion of the study, which lasted 10 weeks. Blood was immediately centrifuged and the plasma frozen at -20°C for the subsequent dose determination of cortisol by radioimmunoassay (RIA). All the blood samples were taken between the hours 9:00 and 10:00 in the morning.

The plasma cortisol level was measured by using the radioimmunoassay Active (DSL) kit.

## STATISTIC ANALYSIS

The data regarding the infestation by fleas and ticks were analysed and reported as percentages. The Fisher test was used to verify the link between the presence and absence of infestation (flea and tick) and the Groups (Control and Skudo).

The concentration of plasma cortisol evaluated using the variance analysis (ANOVA). The multiple comparison test (Tukey) was used to compare the averages. The level of significance was set at  $p < 0.05$ .

## RESULTS

### GENERAL COMMENTS

The “Skudo” device was well tolerated by dogs and no alteration in their behaviour was observed during this study. Yet, mention must be made about the specific case of one nervous dog and prone to fight with other dogs for marking territory; as a consequence of these fights, the “Skudo” device was destroyed on a few occasions (Figure 1).

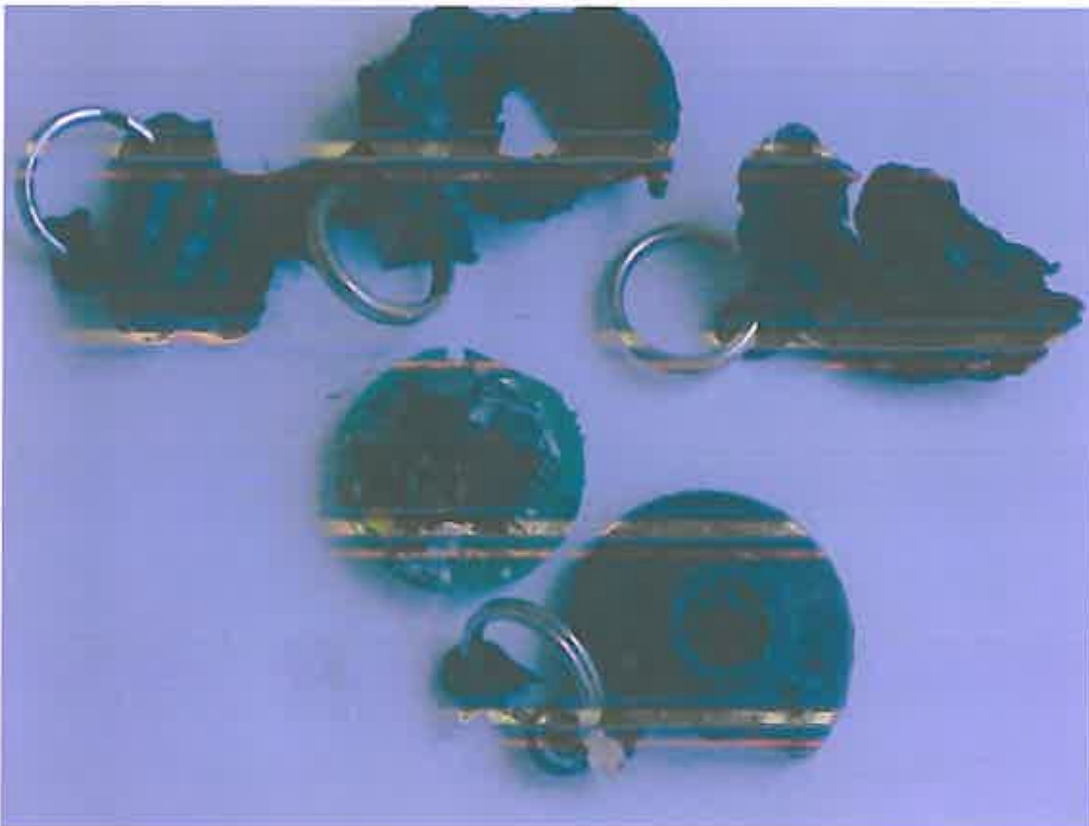


Figure 1. “Skudo” devices broken from chewing by the dogs.

## EFFECT OF THE “SKUDO” DEVICE IN CONTROLLING THE FLEA INFESTATION

For the clinical diagnosis, all the animals held by the Department of Veterinary Medicine – Unesp and then used for the research were actually infested by fleas (*Ctenophalides* sp) and by ticks (*Rhipicephalus* sp).

The results demonstrate that a standard anti-parasite method (in this specific case, with a shampoo containing pyrethroid) was not sufficient to eliminate fleas, since 28% of the dogs continued to be infested over 5 weeks after the bath (35<sup>th</sup> day – Figure 2). Associated with the anti-parasite shampoo, the “Skudo” device had a synergistic effect by augmenting the efficient elimination of the fleas. In fact, the percentage of animals infested in the Skudo Group (0%) was lower than the one of the Control Group (28%), and this result was already observed on the day after the application of the pyrethroid composition (3<sup>rd</sup> day of the test – Figure 2).

Unfortunately, the number of dogs involved in this study was not sufficient to achieve a significant difference in the statistically analysed results. Nevertheless, the difference seen between the two Groups constitutes an extremely important result from a biological point of view.

It should be noted that only a limited percentage of the animals belonging to the Skudo Group was observed as infested on the 3<sup>rd</sup> week of the experiment (21<sup>st</sup> day – Figure 2), but not in the following weeks. This result suggests that fleas present in the environment may still infect the animals, but do not remain in their coats, thus demonstrating the efficacy of the “Skudo” in repelling fleas.

Results show that from the 6<sup>th</sup> week (42<sup>nd</sup> day – Figure 2) to the 10<sup>th</sup> week (70<sup>th</sup> day – Figure 2), the animals of both experimental Groups were completely free of fleas. This fact leads us to hypothesize that the ultrasonic waves emitted by the “Skudo” device may have contributed to the disinfestation of fleas from the Control Group thanks to the contact between the two Groups. Yet, new studies are necessary to confirm this hypothesis, by determining in the specific conditions the range of action of ultrasonic waves emitted by the device.

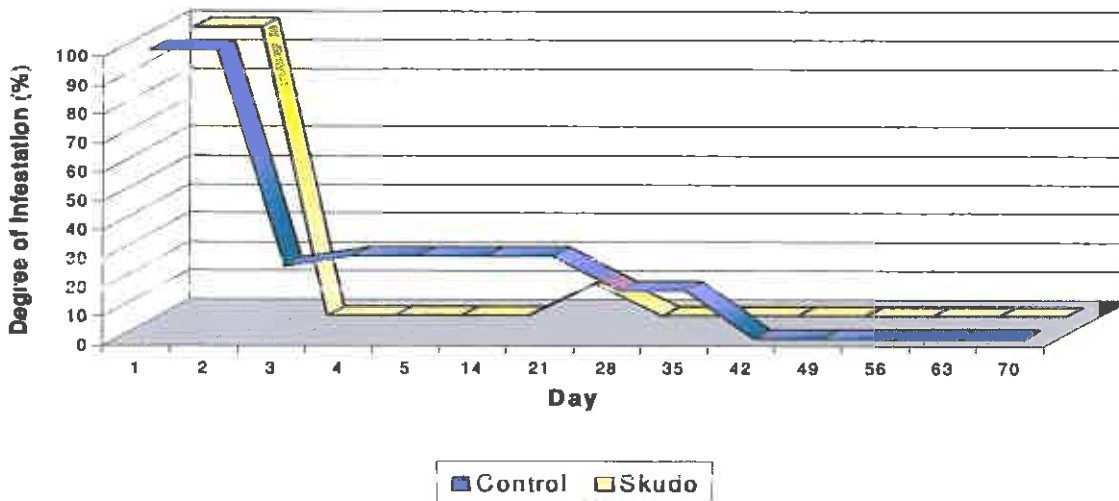


Figure 2. Efficacy of the “Skudo” device in the control of flea infestation in dogs. 2<sup>nd</sup> day: bath with anti-parasite shampoo and application of the “Skudo” device. Values are represented as mean of the Groups.

## EFFECT OF THE “SKUDO” DEVICE IN THE CONTROL OF TICK INFESTATION

The results demonstrate that there is a relevant decrease in the percentage of animals infested by ticks in the days after the bath with anti-parasite shampoo, in both the groups of animals. (Figure 3).

Dogs belonging to both experimental Groups were free of infestation for the first 3 weeks of the study (21<sup>st</sup> day – Figure 3), but from the 4<sup>th</sup> week (28<sup>th</sup> day – Figure 3), reinfestation was observed. During the 9<sup>th</sup> week, (63<sup>rd</sup> day) approximately 80% of the dogs of both groups were infested and during the 10<sup>th</sup> week (70<sup>th</sup> day – Figure 3) the level of infestation was 80% in the Skudo Group and 100% in the Control.

In general, it should be noted a minor percentage of infested animals in the Skudo Group, when compared with the Control Group, even if the difference is not significant (Figure 3).

The results demonstrate that animals bearing the “Skudo” device showed a lower level of tick reinfestation with respect to the animals of the Control Group. Though the difference in the infestation level was not statistically significant (due to the limited number of animals involved), it does not exclude the important achievement from a biological point of view. The fact that the infestation level in the dogs of the Skudo Group was lower than 20% in comparison with the one of the animals of the Control Group is biologically very important. The presence of ticks in the environment can be seen in Figure 4.

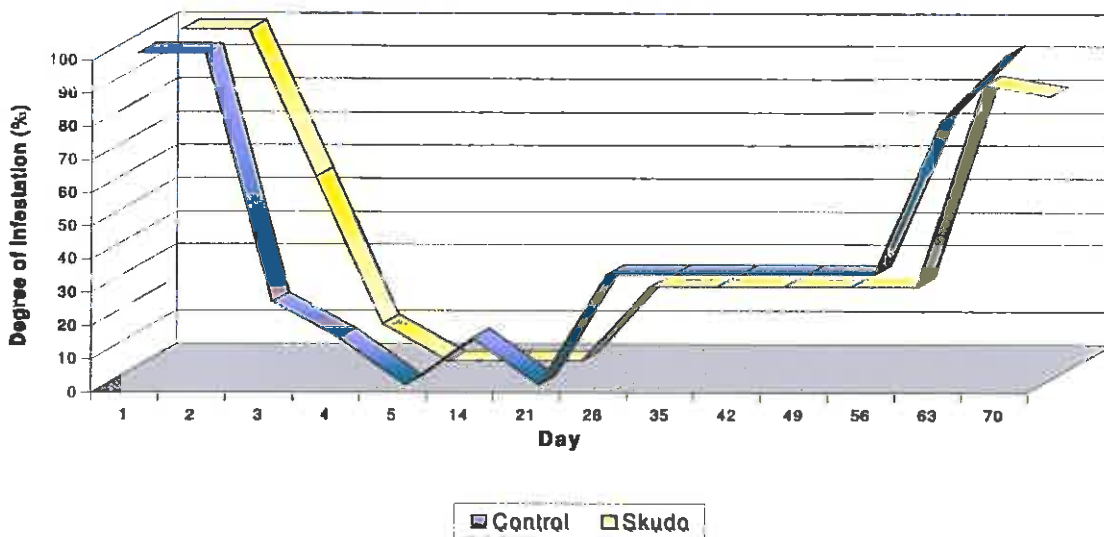


Figure 3. Efficacy of the “Skudo” device in controlling the tick reinfestation on dogs. 2<sup>nd</sup> day: bathed with anti-parasite shampoo and application of the “Skudo” device. Values are represented as the mean of the Groups.

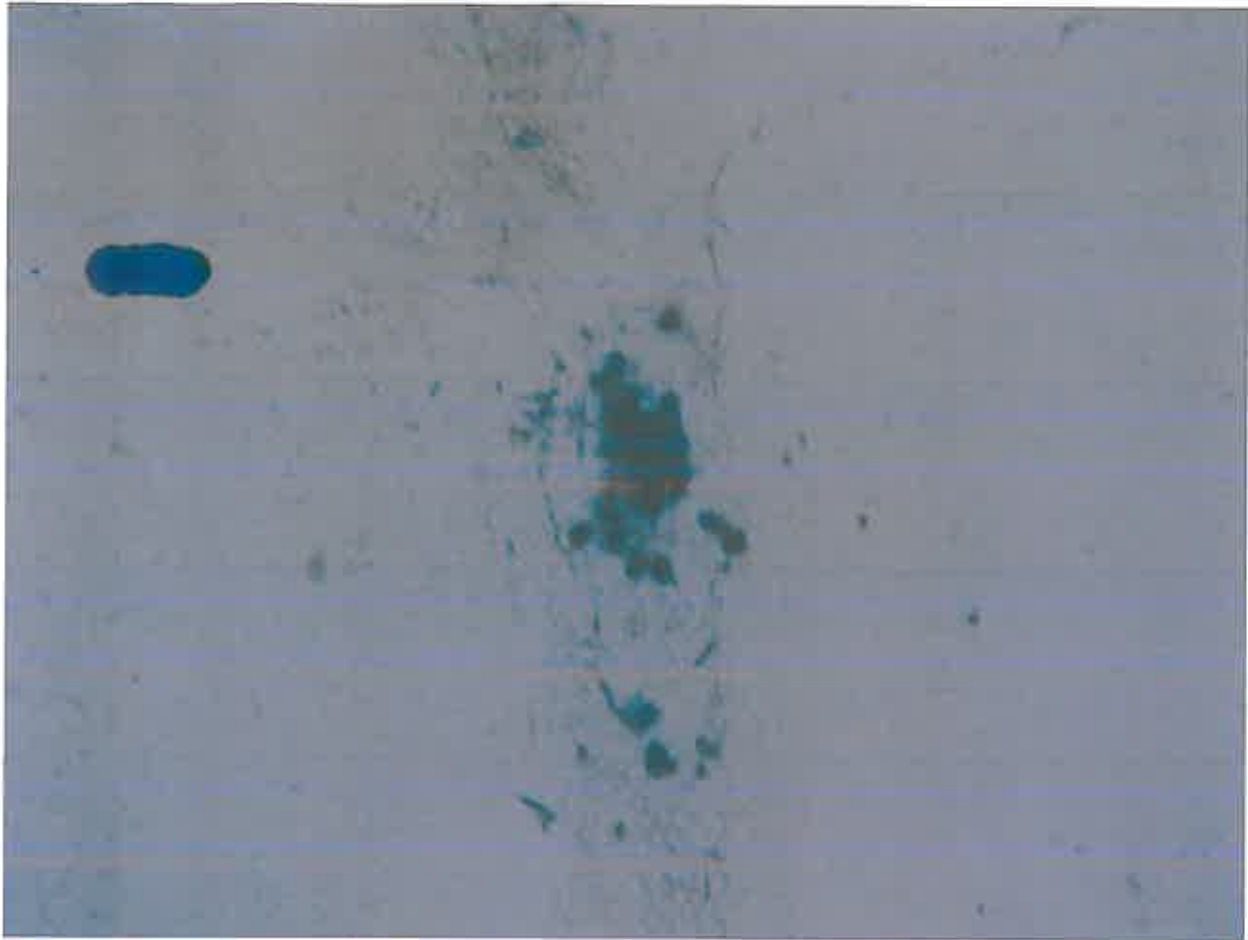


Figure 4. Presence of ticks on the kennels walls (10<sup>th</sup> week of the experiment).

#### EFFECT OF THE “SKUDO” DEVICE ON THE HEALTH OF THE ANIMALS.

As previously mentioned, the “Skudo” device was well tolerated by the dogs, no alteration in their behaviour resulted during the duration of the experiment.

The present study examined the effect of the ultrasonic waves emitted by the “Skudo” device on the state of health of the dogs wearing such device. For this purpose, the plasma cortisol concentration was monitored in the dogs involved in the study (those wearing the “Skudo” device on the collar as well as those not wearing it) since an elevated level of this hormone is indicative of the presence of acute stress. Before applying the device, the levels of plasma cortisol, detected by the radioimmunoassay, were equal to  $0,59 \pm 0,16 \mu\text{g/dl}$  for the dogs in the Control Group and  $0,31 \pm 0,05 \mu\text{g/dl}$  for the “Skudo” Group (Figure 5), without a significant difference between the two groups. Such values were considered normal for the canine breed (values for baseline serum cortisol concentration in normal non-stressed dogs range between 0.5 and 6.0  $\mu\text{g/dl}$ , according to Feldmann & Nelson, 1996).

Soon after applying the device on the dogs’ collars, (3<sup>rd</sup> day of the experiment), the cortisol levels were equal to  $0,34 \pm 0,13 \mu\text{g/dl}$  for the Control Group and  $0,33 \pm 0,03 \mu\text{g/dl}$  for the Skudo Group, without a significant difference between the groups (Figure 5).

From the application of the “Skudo” device on the dogs’ collars, blood samples were taken weekly to determine the plasma cortisol levels.

The results demonstrate that there has not been a significant variation in the concentration of plasma cortisol over the 10 weeks of the study, both for the Control Group and for the Skudo Group (ANOVA;  $p > 0,05$ ). Similarly, no significant difference was observed in comparing the concentration of plasma cortisol between the Control Group and the Skudo Group with blood samples taken on the same day (t test;  $p > 0,05$ )

Though there has not been a significant variation in the plasma cortisol concentration over the period of this study, a peak in the secretion of cortisol in dogs belonging to both groups was observed during the 4<sup>th</sup> week of the study (28<sup>th</sup> day) (Figure 5). Similarly, the tick reinfestation began during the 4<sup>th</sup> week (Figure 3). The data demonstrate the acute stress effect of ectoparasites on dogs, evidenced by the sudden elevation of plasma cortisol levels. The infestation by ectoparasites altered the plasma cortisol concentration, even without going beyond the levels considered normal for dog species. Results demonstrate that the ultrasonic waves emitted by the “Skudo” device have not represented a stressing stimulus for the animals, since neither alteration in the dog behaviour was observed, nor even any variation in the plasma cortisol concentration in dogs bearing the “Skudo” device.

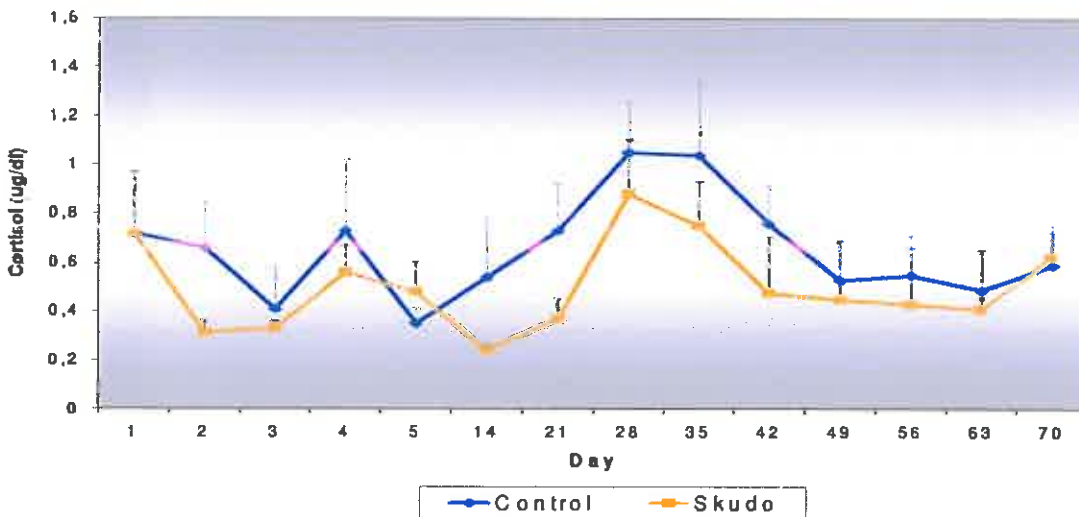


Figure 5. Plasma cortisol levels in the dogs wearing and not wearing the “Skudo” device. Values are presented as mean results  $\pm$  standard error of the mean. 2<sup>nd</sup> day: bath with anti-parasite shampoo and application of the “Skudo” device.

## CONCLUSION

The results of the present study demonstrate that the combination of the “Skudo” device and of a standard anti-parasite method (bath with shampoo containing pyrethroid) has a positive, synergistic effect decreasing the ectoparasite reinfestation in a totally natural and non-toxic way, thus favouring the animal’s health. On the basis of the resulting experimental evidence, we recommend the use of the “Skudo” device in association with a standard anti-parasite method for preventing the ectoparasite infestation in the dogs.



## REFERENCES

Breazile JE (1988). The physiology of stress and its relationship to mechanisms of disease and therapeutics. In: Howard JL (Editor). *The Veterinary Clinics of North America. Stress and Disease in Cattle*. W. B. Saunders Company, Philadelphia.

Campbell JB (1988). Arthropod-induced stress in livestock. In: Howard JL (Editor). *The Veterinary Clinics of North America. Stress and Disease in Cattle*. W. B. Saunders Company, Philadelphia.

Campbell WE (1992). *Behavior problems in dogs*. American Veterinary Publications, INC, California.

Feldmann EC & Nelson RW (1996). *Canine and feline endocrinology and reproduction*. W. B. Saunders Company, Philadelphia.