International Journal of Livestock Research, Vol. 15 (6) Jun' 2025
http://www.ijlr.org
eISSN: 2277-1964
NAAS Score:4.31

Review

Fading Puppy Syndrome in Canine Breeding - Insights and Best Practices

Nagendra Singh[1], Anuj Kumar[1], Akhil Patel[2], Anupama Verma[3], and Rishi Kumar[4]

[1]Department of Veterinary Gynaecology and Obstetrics, College of Veterinary and Animal Science, DUVASU, Mathura, Uttar Pradesh (281001) INDIA
[2]Department of Veterinary Gynaecology and Obstetrics, College of Veterinary and Animal Science, Sardar Vallabhbhai Patel University of Agriculture and Technology, SVPUAT, Meerut, Uttar Pradesh (250110), INDIA
[3]Division of Medicine, IVRI, Izatnagar, Bareilly, Uttar Pradesh (243123), INDIA
[4]Division of Livestock Products Technology, IVRI, Izatnagar, Bareilly, Uttar Pradesh (243123) INDIA

*Corresponding Author: snagendrasingh23@gmail.com

How to cite this paper
Singh, N., Kuamr, A., Patel, A., Verma, A., & Kumar, R. (2025). Fading Puppy Syndrome in Canine Breeding - Insights and Best Practices. *International Journal of Livestock Research*, *15*(6), 28–33.

Received : Apr 30, 2025
Accepted : Jun 23, 2025
Published : Jun 30, 2025

Abstract

Fading puppy syndrome is a complicated illness that poses challenges for both neonatal care and dog breeding. The etiology is complex and arises from various factors, including genetic predispositions, infectious causes, environmental stress from extreme temperatures, deficiencies in management practices, and heavy parasitic infestations. Good prepartum nutrition, correct deworming and vaccination of the dam, enough colostrum feeding of the pups, good hygiene and management practices, and monitoring of the routine health status of pups can all help reduce losses caused by fading puppy syndrome.

Keywords: Breeding, Fading Puppy Syndrome, Management, Neonatal Mortality.

Introduction

Fading Puppy Syndrome (FPS) is a prominent issue in veterinary neonatology, accounting for significant neonatal losses in dogs. This condition usually appears within the first two weeks of life and is characterized by the sudden demise of apparently healthy puppies. FPS can involve either an individual pup or an entire litter, underlining its complex and multifactorial nature (Gill, 2001; Blunden, 2012). Initially this condition manifested a day after delivery or at the age of 2 to 10 days. This condition significantly contributes to preweaning mortality, which may reach alarming levels of up to 30%, including losses attributed to stillbirths (Gill, 2001; Ranjan, 2010). The syndrome is a manifestation of multiple underlying causes, such as infectious, environmental, genetic, and maternal factors, rather than a single disease. This is a common condition which is reported by many dog breeders with high neonatal mortality, regardless of all appropriate treatment and management. These high mortality rates not only compromise animal welfare but also pose financial and operational challenges to canine breeding enterprises.

Etiology

FPS has a wide range of frequently intricate causes, which includes:

A. Infectious Causes

The fading puppy syndrome can result from various infectious agents, including viruses, bacteria, and parasites, all of which play a significant role in its development.

i. Bacterial Infection

Bacterial infections are a significant health risk for puppies under one to two weeks of age. Infections can occur during pregnancy, through exposure in the birthing canal, or via the umbilical cord stump after birth. Bacterial infections such Streptococcus species and *Escherichia coli* are further pathogenic agents linked to FPS. These infections can impair neonatal puppies' capacity to grow by causing serious respiratory, gastrointestinal, or other systemic infection or sepsis (Ranjan, 2010). Pathogenic bacteria can enter the pup, leading to a deteriorating condition within 2 to 5 days. Infected pups are usually weak and prone to septicaemia, vomiting, diarrhea, abdominal distension, and constant crying (Davidson, 2003). Treatment is effective only when diagnosed and treated early.

ii. Viral Infection

Canine herpesvirus (CHV) is a widely recognized infectious agent and a significant contributor to FPS, as documented by Salib (2013). CHV is highly contagious and can be transmitted from the dam to the puppies during birth or through close contact. Puppies infected with CHV often exhibit symptoms such as lethargy, respiratory distress, and failure to suckle, leading to rapid deterioration and death (Khan *et al*., 2009). Other infectious agents implicated in FPS include canine parvovirus, canine distemper virus. These infections can cause severe gastrointestinal, respiratory, or systemic disease in neonatal puppies, compromising their ability to thrive (Soni *et al*., 2024).

iii. Parasite

Neonatal deaths have been observed in pups infected with *Toxoplasma gondii*, *Toxocara canis*, and *Neospora caninum* through the transplacental route. Congenital infections may result from hookworms and roundworms crossing the placenta (Goldberg, 2011). Toxocara canis infections can result in neonatal fatalities due to huge worm load that obstruct the gastrointestinal tract or migrate up the biliary tract and results in hepatitis (Ettinger and Feldman, 2012). According to Salib (2013), up to 90% of puppies are afflicted with T. *canis* during pregnancy. The symptoms of an infected pup include diarrhea, increased or decreased appetite, poor digestibility, pot bellied appearance, and inability to grow or even death if prompt treatment is not given (Ranjan, 2010; Khan *et al*., 2009). It is important to regularly deworm the breeding bitch to prevent pup losses from Toxocara infections.

B. Environmental and Managemental Causes

The syndrome can be exacerbated by hypothermia, hyperthermia, limited ventilation, and poor sanitation.

i. Hypothermia

Neonates are more vulnerable to becoming overly hot or chilly during the first week of life since their body temperature fluctuates with their surroundings (Khan *et al*., 2009). Their ability to shiver, cuddling aids in keeping them warm during the first six days of life along with external warmth. Cold exposure can lead to hypothermia, low heart rate, and respiratory system collapse, potentially causing death. In newborn puppies, the body temperature typically ranges from 36.5°C to 37.0°C, which is lower compared to older dogs. Within one to two weeks of age, this gradually increases, reaching a stable range of 37.5°C to 38.0°C as they mature. Heat stress is less common, but it may occur due to external warmth and hot climate. They learn to pant in reaction to overheating during this phase.

ii. Environmental Toxins

Neonates are more susceptible to chemical absorption through their thinner skin than adults. Additionally, inhaling chemical vapours is another issue. Therefore, evaluate bedding materials and products for cleaning whelping or queening boxes. Avoiding pine oils, phenols, and direct contact with bleach or ammonium residue. Always use gentle cleaners and remove residue before contact.

iii. Haemolytic Anaemia

This type of anaemia in Puppies rises due to blood transfusions from a bitch with a blood group identical to their own. Transmission of maternal antibodies via colostrum can lead to a haemolytic crisis in neonatal puppies. These puppies exhibit jaundice, weakness, and anemia (Khan *et al*., 2009).

iv. Nutritional Deficiencies

Immunodeficiency and poor development might result from suboptimal nursing methods, inadequate colostrum intake, or poor maternal nutrition, which puts puppies at risk for PFS (Ranjan, 2010).

C. Genetic Factors and Congenital Anomalies

Genetic predisposition to PFS may exist in some breeds, and congenital anomalies including cleft palates and heart problems might raise the risk of death (Freshman, 2005, Vilar *et al*., 2018). According to research, inbreeding with high close relationship results in more deformities; this could be because of genes that are incompatible (Wydooghe *et al*., 2013, Batista *et al*., 2014).

D. *Maternal Factors*

Higher incidence of PFS is linked to maternal factors, including poor maternal health (overweight and older dams), a lack of maternal antibodies and inappropriate parental behavior, such as neglect or hostility against puppies (Velayudhan, 2019). Lack of milk supply, refusal to allow nursing, or a dam's reluctance to lie and warm the newborns are all signs of maternal neglect. Additionally, dogs with large bodies or barrels may trip over or unintentionally crush puppies.

E. Maternal Gut Microbiota

The development of newborn microbiota is influenced by factors like environment, mother's health, and colostrum intake. Colostrum is crucial for offspring's survival and health, and the composition of meconium from neonates resembles dams. Gut microbiota contributes to weight gain in puppies, and maintaining a balanced intestinal microbiota is vital for offspring's health. The health of the offspring depends on a healthy gut microbiota since an imbalance can leads to a serious condition like Fading Puppy Syndrome.

Clinical Presentation

The clinical manifestations of FPS can vary in intensity (mild or severe form) and are frequently nonspecific and ambiguous (Freshman, 2005; Indrebo *et al*., 2007; Lopate, 2009; De Cramer, 2015). Despite a healthy appetite and proper nutrition, the pups may not be growing or gaining weight, poor body condition, dull and depressed, bloated abdomen, rough hair coat seen in mild form. While, in Severe form affected pup does not show any response when

disturbed or decreased activity and inability to suckle, constant crying (referred to this as 'seagulling' due to its similarity to the cry of seagulls), restlessness, diarrhoea, breathing difficulties, distended tympanic abdomen, low body temperature and convulsions quickly progress to severe lethargy, loss of muscle tone, and death (De Cramer, 2015).

Diagnosis

Diagnosis of PFS remains challenging due to its non-specific and indistinct clinical symptoms**.**

Category	Test/ Examination	Purpose	Key findings
Clinical Examination	Physical assessment	Evaluate vitality, hydration, reflexes, body temperature.	Hypothermia (<34°C), weak suckling reflex, dehydration, abdominal distension
	Behavioral Observation	Identify signs of distress or failure to thrive.	Lethargy, constant crying ("seagulling). Inability to nurse.
Laboratory Tests	Complete Blood Count (CBC)	Detect anemia, infection, or sepsis.	Leukocytosis (bacterial) or leukopenia (viral); anemia (e.g., hemolytic).
	Blood Glucose Test	Rule out hypoglycemia.	Glucose <40 mg/dL (critical in neonates).
	Blood Gas Analysis	Assess metabolic imbalances (e.g., acidosis).	Metabolic acidosis (due to sepsis or hypothermia).
	Fecal Examination	Detect parasitic infections.	Toxocara canis eggs, hookworm larvae.
Microbiology	Bacterial Culture	Identify septicemia (blood, urine, or tissue).	Escherichia coli, Streptococcus spp., or other pathogens.
	PCR Testing	Detect viral DNA/RNA (e.g., CHV, parvovirus)	Canine herpesvirus (CHV), canine parvovirus (CPV-2).
Imaging	Radiography (X-ray)	Rule out congenital anomalies or GI obstructions.	Cleft palate, intestinal blockage (e.g., roundworms), pneumothorax
	Ultrasound	Evaluate organ integrity (e.g., liver, heart).	Congenital heart defects, ascites.
Post-Mortem	Necropsy	Determine cause of death in deceased pups.	Hemorrhages (CHV), parasitic migration, bronchopneumonia.
	Histopathology	Microscopic tissue analysis.	Necrotizing hepatitis (Toxocara), viral inclusion bodies (CHV).
Environmental	Whelping Area Inspection	Assess hygiene, temperature, and ventilation	Poor sanitation, hypothermia (ambient <30°C for new borns).
Maternal	Dam Health Evaluation	Review vaccination/deworming history, milk quality.	Low colostrum antibodies, mastitis, or malnutrition.

Supportive Therapy

As soon as a puppy exhibits signs of acute illness, it should be taken to the veterinarian. Newborn puppies have limited nutritional stores, therefore proper nursing care is crucial and critical in early hours of life. A few drops of honey should be applied over the tongue of the affected puppy at intervals of one to two hours, and the animal must be kept warm. If possible, try bottle-feeding of milk. In order to prevent the transmission of infection, the affected puppy should be kept away from the other healthy puppies. Dry the naval cord and frequently apply a diluted liquid

iodine solution. Due to their extremely low energy stores, pups quickly become hypoglycemia (blood glucose level <30-40 mg/dl) following food deprivation. The recommended intravenous dose for such pups is 2 to 4 ml/kg of 10% dextrose solution. Alternatively, a 5% dextrose solution can be administered intravenously every 12 hours at a rate of 1 ml per 30 grams of body weight (Davidson, 2003; Ranjan, 2010). If the pup has a suckling response, a baby-nursing bottle with a nipple attached can be used to administer a rehydration solution comprising glucose and electrolyte (5 g glucose + a pinch of electrolyte mixture mixed in 100 ml water), 5 ml of this solution per 100 grams of body weight can be administered every six to eight hours. If a puppy cannot nurse on its own, feeding assistance may be provided through an eyedropper (Indrebo *et al.*, 2007). Antibiotics can be helpful in infectious conditions when used with hygiene and management, however, because newborns are particularly vulnerable, careful selection of antibiotics is necessary.

Preventive Measures

Provide proper nutrition to dam during pregnancy and lactation. Early neonatal losses can be decreased by proper vaccination and deworming. Selection of healthy individuals for breeding, assessing for genetic disorders and making sure the dam is in good condition before breeding. For the first two weeks, the pups weight should be noted every day; for the next two weeks, it should be noted every three days. Puppy may lose up to 10% of its body weight during the first 24 hours of life, which is considered a normal occurrence. A broad spectrum non-toxic anthelmintic such as pyrental palmoate (5 mg/kg) should be given orally at 3 weeks of age and then every 14 days until the pup is 12 weeks old. Use a room thermometer that is positioned at the level of the bedding to keep an eye on the temperature of the room. During the first week of life, the floor temperature for a puppy should ideally be maintained around 30°C, while for older puppies, it is recommended to keep it within the range of 25°C to 27°C, as noted by Davidson (2003). It is essential to provide hygienic bedding, feeding utensils and proper ventilation to both dam and new born pups.

Conclusion

Fading Puppy Syndrome (FPS) is a significant issue in dog breeding, causing significant losses. Despite the challenges, it is possible to mitigate the situation by focusing on preventive care, early recognization, and swift action. Additionally, preventive care emphasizes ensuring the dam's health, administering necessary vaccinations, and providing adequate nourishment. Early detection can help identify distress signals, and immediate action can save a puppy. Breeders who prioritize hygiene, maternal health, and neonatal monitoring often see fewer losses. While no single solution exists, every puppy is worth the effort, and attentive care is crucial.

Contribution by Authors

The idea for the manuscript write-up and proofreading was provided by Anuj Kumar and Akhil Patel. Nagendra Singh and Anupama Verma drafted the manuscript. Rishi Kumar and Nagendra Singh reviewed the manuscript for plagiarism and grammar. The final manuscript was read and approved by all authors for publication.

Conflict of Interests

There is no conflict of interest.

Publisher Disclaimer

IJLR remains neutral concerning jurisdictional claims in published institutional affiliation.

References

1. Batista, M., Moreno, C., Vilar, J., Golding, M., Brito, C., Santana, M., & Alamo, D. (2014). Neonatal viability evaluation by Apgar score in puppies delivered by cesarean section in two brachycephalic breeds (English and French bulldog). *Animal Reproduction Science, 146*(3–4), 218–226.
2. Blunden, T. (2012). Fading puppies–reality or myth? *In Practice, 34*(6), 314–321.
3. Davidson, A. P. (2003). Recent advances in small animal reproduction (Concannon, P. W., et al.). *International Veterinary Information Service.*

4. De Cramer, K. G. M. (2015). Canine neonatology. *Journal of the South African Veterinary Association, 86*(1), 1–15.
5. Ettinger, S. J., & Feldman, E. C. (2005). *Textbook of veterinary internal medicine* (7th ed., Vol. 2, pp. 1017–1019, 1751–1752). Saunders.
6. Fox, M. W., & Haynes, E. (1966). Neonatal colibacillosis in the dog. *Journal of Small Animal Practice, 7*(9), 599–604.
7. Freshman, J. L. (2005, November). Initially treating fading puppies and kittens. *Veterinary Medicine, 100*(11), 800.
8. Gill, M. A. (2001). Perinatal and late neonatal mortality in the dog. *Journal of Reproduction and Fertility. Supplement, 57*, 273–276.
9. Goldberg, S. (2011). *Fading puppy syndrome.* http://www.perdack.co.uk/molesend/fps.pdf
10. Indrebø, A., Trangerud, C., & Moe, L. (2007). Canine neonatal mortality in four large breeds. *Acta Veterinaria Scandinavica, 49*(Suppl 1), S2. https://doi.org/10.1186/1751-0147-49-S1-S2
11. Khan, F. A., Dutt, R., Deori, S., & Das, G. K. (2009). Fading puppy complex—An overview. *Intas Polivet, 10*(2), 335–337.
12. Lopate, C. (2009). Diseases and disorders of the canine neonate. *Theriogenology, 71*(1), 71–73.
13. Ranjan, A. (2010). Fading puppy syndrome: An overview. *Veterinary Practitioner, 11*(2), 171–173.
14. Rohit, R. (2021, September). Fading puppy syndrome (early death) in dogs: Prevention and treatment. *Pashudhan Praharee.* https://www.pashudhanpraharee.com/fading-puppy-syndrome-early-death-in-dogs-prevention-and-treatment/
15. Salib, F. (2013). Fading puppy syndrome associated with *Toxocara canis* infection. *Journal of Advanced Veterinary Research, 3*(3), 93–97.
16. Soni, A., Rajput, J., Patidar, A., & Maurya, V. K. (2024, September). Puppy fading syndrome: Understanding the cause, diagnosis, and management strategies. *Pashudhan Praharee.* https://www.pashudhanpraharee.com
17. Uchanska, O., Ochota, M., Eberhardt, M., & Nizanski, W. (2022). Dead or alive? A review of perinatal factors that determine canine neonatal viability. *Animals, 12*(11), 1402. https://doi.org/10.3390/ani12111402
18. Velayudhan, V. (2019). *Risk factors associated with fading puppy syndrome in canines* (Doctoral dissertation). Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, Punjab, India.
19. Vilar, J. M., Batista, M., Pérez, R., Zagorskaia, A., Jouanisson, E., Díaz-Bertrana, L., & Rosales, S. (2018). Comparison of three anesthetic protocols for the elective cesarean-section in the dog: Effects on the bitch and the newborn puppies. *Animal Reproduction Science, 190*, 53–62. https://doi.org/10.1016/j.anireprosci.2018.01.007
20. Wydooghe, E., Berghmans, E., Rijsselaere, T., & Van Soom, A. (2013). International breeder inquiry into the reproduction of the English bulldog. *Vlaams Diergeneeskundig Tijdschrift, 82*(1), 38–43.

****