



## **Semen Quality, Supplementation, and Nutritional Effects on Breeding Success**

*The Role of Semen Quality and Nutrition in Canine Breeding Success*

by Dr. Natalie Orner, DACT

Semen quality and its assessment is one of the most critical and often overlooked factors influencing reproductive success in canine breeding programs. Whether utilizing natural breeding, fresh chilled semen, or frozen semen, optimizing semen parameters can significantly impact conception rates, litter size, and overall reproductive efficiency.

For breeders, understanding how to evaluate and support semen quality through targeted nutrition and supplementation can be a powerful tool in helping support reproductive outcomes.<sup>1,8,9,12,13,14</sup>

### **Understanding Semen Quality**

*Semen quality is typically evaluated based on several key parameters:<sup>2,9</sup>*

**Progressive Motility:** The percentage of active sperm moving in a forward direction- critical for fertilization

**Morphology:** The percentage of sperm with normal structure.

**Viability:** Assesses the number of live sperm with an intact plasma membrane.

**Concentration:** The number of sperm per milliliter of semen.

**Total sperm count:** Overall sperm numbers in the ejaculate.

👉 A complete semen evaluation performed by a veterinarian or theriogenologist is essential prior to breeding, particularly in stud dogs with a history of subfertility or inconsistent conception rates.

It is important to note that semen quality can vary between collections and may be influenced by factors such as *stress, illness, age, frequency of collection, environmental conditions, and nutritional status.*<sup>2,4,5</sup>

## Common Causes of Reduced Semen Quality<sup>4,5,7</sup>

Declines in semen quality are multifactorial. Many things can have an impact on your stud dog's sperm quality or fertility. Heat stress, elevated environmental temperatures, systemic illness or fever, advanced age or immature reproductive status, testicular degeneration, or any underlying reproductive disease can all be causes for decline in semen quality. Working dogs including field trial, hunting, or herding dogs are particularly predisposed to heat stress and elevated environmental temperatures. It's important to note that these common causes can affect sperm quality even if exposed to them many weeks prior to breeding.

👉 Even a single fever event can negatively impact sperm development for up to 60 days, making historical health information critically important when your veterinarian is evaluating your stud dog.

## When to Consider Supplementation

Not all stud dogs require supplementation. However, it may be beneficial in the following situations:

- Suboptimal semen parameters on evaluation.
- High-performance or frequently used stud dogs.
- Aging males with declining fertility.
- Recovery following illness, stress, or travel.
- Breeding programs that rely heavily on cooled or frozen semen.
- Supplementation should always be viewed as an adjunct—not a replacement—for proper veterinary evaluation and management.

## Key Supplements for Semen Quality

Multiple nutraceutical studies have been performed in men to evaluate their effect on sperm quality and fertility. These studies are often extrapolated to canine reproduction; however, a few have been shown to have effects in the canine as well.

**Antioxidants:**<sup>1</sup> Oxidative stress is a major contributor to sperm damage. Antioxidants help protect DNA integrity and the sperm membrane. Vitamin E and C are common antioxidants added to diets that can positively influence semen quality.<sup>1</sup>

👉 Antioxidant supplementation is particularly useful in cases of poor motility or increased abnormal morphology.

## Omega-3 Fatty Acids<sup>8,9</sup>

Omega-3 fatty acids (especially DHA) play a role in sperm membrane fluidity and overall motility through integration into the sperm cell membrane. They may support improved sperm motility, enhanced membrane integrity, and reduced inflammation through careful supplementation.

👉 Remember that dogs do not efficiently convert plant-based sources of omega-3 fatty acids into DHA. Using a marine-based source of DHA is important as it supports the benefits listed above.

### **L-Carnitine<sup>11</sup>**

L-carnitine is essential for energy metabolism in many cells in the body, including sperm cells. Benefits of L-Carnitine to the stud dog may include improved progressive motility, enhanced utilization of spermatogenic energy, and better overall function.

*Matalliotakisi I, Koumantaki Y, Evageliou A, et al: L-carnitine levels in the seminal plasma of fertile and infertile men: correlation with sperm quality. Int J Fertil Womens Med 2000;45:236-240.*

### **Zinc<sup>9</sup>**

Zinc plays a critical role in normal spermatogenesis and is essential for conception and implantation. Zinc concentrations are high in the seminal plasma of dogs with normal fertility and may be important in the fertilization process.

*Alonge S, Melandre M, Leoci R, et al: The effect of dietary supplementation of vitamin E, selenium, zinc, folic acid, and n-3 polyunsaturated fatty acids on sperm motility and membrane properties in dogs. Animals 2019;9:1-16.*

Deficiencies in Zinc may result in:

Reduced sperm count, poor motility, and hormonal imbalances.

👉 Zinc should be supplemented carefully to avoid excessive intake, which can be counterproductive and detrimental to the pet.

> *I recommend using a diet that is already fortified in the above nutrients in optimal quantities to support sperm health. Royal Canin's HT 42d has been shown to increase thawed and fresh*

*sperm motility after 60d of feeding.<sup>12</sup> In addition to antioxidants, zinc, and L-carnitine, it contains marine sourced DHA to support the plasma membrane of the sperm cell and to support overall semen quality.<sup>13,14</sup>*

## **Implementation**

When introducing supplementation it is always recommended to start with a veterinary-guided plan based on results of a semen analysis. It is also imperative to allow adequate time for supplementation or diet change to work- remember that the spermatogenic cycle is 60 days. This means that most supplements require at least 60 days to reflect changes in the semen analysis. Always use high quality, reputable products with consistent dosing that are safe for canines. Feeding a diet that is already fortified in the above nutrients like HT 42d is a safe way to provide supplementation to the stud dog.

Avoid over supplementation or combining multiple products without veterinary guidance. Progress should be monitored over multiple spermatogenic cycles with repeat semen evaluations performed by your reproductive veterinarian.

## **Management Considerations**

Supplementation alone cannot overcome poor management. Optimal reproductive performance also depends on maintaining ideal body condition and nutrition, minimizing heat exposure (especially to the scrotum), managing stress and travel schedules, as well as practicing appropriate breeding frequency. Finally, the overall health and preventative care of your stud dog is of the utmost importance and cannot be ignored when looking to improve breeding efficiency.

 A holistic approach combining nutrition, management, and veterinary oversight helps support the best reproductive outcomes.

## **Why it Matters**

By proactively evaluating semen quality and implementing evidence-based supplementation when appropriate, breeders can improve conception rates, maximize litter size potential, reduce failed breedings and associated costs, AND support long-term reproductive health of stud dogs. Small, informed adjustments can make a significant difference in breeding success. With careful monitoring and a science-driven approach, optimizing semen quality becomes a practical and achievable goal.

## Interested in HT 42d?



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- Earn exclusive rewards.
- Grow your program.

Dr. Natalie Orner obtained her veterinary degree from the NC State College of Veterinary Medicine before returning for a comparative theriogenology residency with a focus on equine and canine reproduction. She was most recently working at a large specialty hospital in North Carolina, serving as the attending theriogenologist over a full-service reproductive practice. She is passionate about expanding access to education surrounding high-quality reproductive care and supporting breeders through her expertise. She is currently working as the senior scientific communications veterinarian supporting PRO diets for Royal Canin North America.

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