Effect of dietary supplementation with sunflower and linseeds oils on fertility and semen quality in pheasants

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Changes in semen quality (concentration and motility) have been some times observed by dietary oil supplementation. Fertility results seem to be contradictory modified by dietary lipid supplementation on chicken males (Blesbois et al., 1997, Cerolini et al., 1998). Aim of the present experiment was to study the effect of dietary inclusion of oils from oleaginous seeds on fertilising ability and characteristics of semen in a nearly wild poultry species, the pheasant.

Forty six pheasant males (*Phasianus colchicus mongolicus)*, milked weekly throughout the reproductive season (March-July), fed two experimental diets (M.E. 12.28 MJ/kg, C.P. 18.2%, total fat 7.7%) containing either 4% sunflower oil or 4% linseeds oil from 40 weeks of age (23 birds/diet). At 43 (11 May), 45 ,47 and 49 weeks of age ejaculates from males on each diet were diluted 1:1 with a commercial extender, pooled and used to asses fertilising ability *in vivo* by artificially inseminating forty-eight laying pheasant hens. Males and females were the same age. Females were inseminated with a single dose of spermatozoa (approximately $100x10^6$) in late afternoon. Egg fertility was recorded. At 46 and 49 weeks of age collected semen was evaluated in volume (by weight), concentration (by hemocytometer procedure) and live spermatozoa (eosin/nigrosin staining). Statistical comparisons were performed using analysis of variance and χ^2 test with respect to percentage data.

Egg fertility results from the data of two consecutive days and over 2- to 7-d or 8- to 15-d intervals from AI are shown in the table 2. Values and trends of fertility were very similar in the treatments at any phase. However, the persistence of fertility in relation to the time after AI was a little greater for the males fed on the sunflower oil supplemented diet in respect to the males on the other diet: the peak of fertility of semen from pheasants on the n-6 polyunsaturates rich oil lasted 2 days longer at any phase (phase 1: 6-7 d vs 4-5 d; phase 2: 4-5 d vs 2-3 d). These data agree with Cerolini et al. (1997, 1998) findings who indicate C20-22n-6 polyunsaturates positively correlated with fertility recorded the 2nd week after AI. They supposed those PUFAs playing a role in mantaining the survival of spermatozoa in female tract.

Table 2 Fertility (%) from set eggs of semen collected from pheasants on the two diets

	Phase 1°		Phase 2°°		
	Sunflower oil	Linseeds oil	Sunflower oil	Linseeds oil	
Days from AI					
2nd+3rd	84.38^{ab}	79.03^{ab}	85.46^{a}	86.05^{a}	
4th+5th	86.96^{a}	90.14^{a}	85.71^{a}	80.56^{a}	
6th+7th	85.92^{a}	79.45^{ab}	81.25^{a}	70.97^{ab}	
8th+9th	73.85^{ab}	70.97^{b}	71.88^{a}	41.94^{cd}	*
10th+11th	74.58^{ab}	73.02^{b}	67.74^{a}	46.88^{bc}	
12th+13th	68.92^{b}	62.90^{bc}	37.84^{b}	53.13^{bc}	
14th+15th	50.00^{c}	46.15^{c}	23.08^{b}	16.00^{d}	
Days interval from AI					
2-7	85.78^{A}	83.01^{A}	84.06^{A}	80.00^{A}	
8-15	66.79^{B}	62.85^{B}	50.79^{B}	40.83^{B}	

°Results pooled from the single AIs performed at 43rd and 45th week; °°Results pooled from the single AIs performed at 47th and 49th week.

Comparison between diets for birds of the same phase: *P<0.05.

Values in the same column followed by different superscripts are significantly different (a,b,c,d: P<0.05, A,B: P<0.01)

Dietary oil supplementation showed a significant effect on percentage of live spermatozoa at 49 weeks of age (Table 3). The proportion of live cells in semen samples was significantly enhanced in the linseeds oil supplemented group compared to sunflower oil group. It seems the n-3 polyunsaturates rich oil slows down the age-related loss of vitality of spermatozoa.

Table 3 Characteristics of semen from pheasants on the two diets at 46 and 49 weeks of age

	46 weeks		49 weeks		
Semen characteristic	Sunflower oil	Linseeds oil	Sunflower oil	Linseeds oil	
Volume (μl)	176.8	149.1	169.2	157.9	
Concentration (10^9 cells/ml)	6,82	6,68	6,93	6,33	
Live spermatozoa (%)	93.25 ^{A}	93.20	86.60 ^{B}	92.20	**

Comparison between diets for birds of the same age: **P<0.01.
Comparison between ages for birds on the same diet: A,B:P<0.01

The results suggest that the dietary inclusion of sunflower or linseeds oil does not affect fertilizing ability of semen although the persistence of fertility is slightly extended by n-6 PUFA rich oil. Moreover, although linseeds oil appears to sustain the decline of live spermatozoa in pheasant semen with advancing age, lipid source had little effect on the considered semen characteristics.

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