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CONSUMPTION OF WHOLE COTTONSEED AND EASIFLO™ COTTONSEED AFFECT GROWTH IN RED DEER STAGS

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Background. Preliminary experiments with consumption of whole cottonseed have shown negative effects on body weight, antler production and testosterone concentration in fallow bucks. A new product called Easiflo™ cottonseed is being marketed as an alternative to whole fuzzy cottonseed. Easiflo™ cottonseed is whole fuzzy cottonseed that is coated with a gelatinized starch solution that contains added iron as ferrous sulfate and other vitamins and minerals. In some species, ferrous sulfate has demonstrated the ability to bind free gossypol, thereby lowering the amount of gossypol active in the animal's body. Another benefit of starch coating fuzzy cottonseed is that it allows it to flow freely through traditional automated feed systems.

Research Findings. Whether fuzzy whole cottonseed (WCS) or Easiflo™ cottonseed (EZF) would affect weight gain, antler development and testis function in red deer (*Cervus elaphus*) was studied. Fourteen red deer stags (BW = 103.9 kg) were randomly allotted into three treatment groups: 1) Control (C; 3:1, corn:soybean meal, n=5), 2) WCS (iron 91 ppm, n=6), 3) EZF (iron 1730 ppm, n=6). Rations were formulated to be isonitrogenous (17.2% protein). Stags grazed ryegrass/Coastal bermudagrass and were supplemented with alfalfa pellets in addition to their experimental ration. Stags were fed as much experimental ration as they would consume, minimizing wastage. Average consumption was 1.82 kg/head/day for all rations. Body weight, body condition score, antler and testis measurements and jugular blood samples were taken biweekly for 211 days. Once in hard antler, ejaculates were collected biweekly via electroejaculation and evaluated for sperm concentration, motility and progressive motility. Plasma gossypol was assessed for all stags on trial. EZF stags had less ($P < 0.03$) gossypol than WCS stags. Average daily gain for WCS stags was less than control stags (Table 1). EZF average daily gain was intermediate between control stags and WCS. Control stags gained 1.81 ± 0.23 units of body condition score while on trial which was greater ($P < 0.005$) than WCS and EZF (Table 1). Change of body condition score during the trial was not different ($P > 0.1$) between WCS and EZF. Total hard antler weight was greater ($P < 0.005$) for control stags (1.46 ± 0.1 kg) than for WCS and EZF stags (0.95 ± 0.09 kg and 0.96 ± 0.09 kg, respectively). WCS antler weight was not different ($P > 0.1$) from EZF. Maximum paired testis volume was greatest

($P < 0.07$) for control stags (198.1 ± 9.13 cc) with WCS and EZF not differing ($P > 0.1$) from each other (158.26 ± 8.17 cc and 172.49 ± 8.17 cc, respectively). Sperm concentration in the ejaculate, sperm motility and progressive motility were not different ($P > 0.1$) between treatments.

Application. While EZF reduced circulating gossypol, some growth traits were negatively affected by EZF consumption. Easiflo™ cottonseed may provide producers with a practical way to utilize whole cottonseed in their mechanized feeding systems, however, the same caution should be used as with the fuzzy whole cottonseed. Documented reduction of plasma gossypol failed to reduce detrimental effects on antler production and body weights. There appears to be a possible threshold gossypol concentration that affects antler production that even a suppression of 50% does not reach. These data supply support for the theory that cervids are not capable of utilizing high fat diets as effectively as other ruminant species.

Table 1. Average daily gain and body condition score change of red deer stags consuming a control ration, fuzzy whole cottonseed (WCS) or Easiflo™ cottonseed (EZF) during the 211 day trial.

Treatment	Average Daily Gain (ADG)	Body Condition Score Change
Control	230 ± 40 g/day ^a	1.81 ± 0.23 ^c
Easiflo™	190 ± 40 g/day ^a	0.75 ± 0.20 ^d
Whole Cottonseed	150 ± 40 g/day ^b	0.65 ± 0.20 ^d

^{a, b} means in columns with different superscripts differ ($P < 0.03$)

^{c, d} means in columns with different superscripts differ ($P < 0.005$)