

STUDY FINDS THAT GOSSYPOL FROM COTTONSEED CAN STUNT DEER ANTLER GROWTH

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VERTON A study by Texas A&M researchers has shown that whole cottonseed has severe detrimental effects on male red deer, diminishing antler development by as much as 50 percent.



The red deer study showed similar results to a study done last year on male fallow deer.

The culprit is gossypol, a toxic element that naturally occurs in cotton plants. The effects of gossypol on ruminants such as red deer and related species deer are not so overt as those on non-ruminants, but seem focused on the animal's physiology.

Additionally, the more recent study tested Easiflo, a commercial cottonseed product coated with iron sulfate in gelatin to make it easier to handle. The study found that Easiflo did indeed reduce the amount of freely circulating gossypol compared with a ration of whole cottonseed, but the remaining gossypol had about the same effect on antler growth, body weight and other measurements.

"The key fact is that we're certain that there is some safe level of whole cottonseed that the animals can consume on a daily basis, but it must be considerably lower than 1.7 percent of body weight," said Dr. Ron Randel, researcher with the Texas Agricultural Experiment Station and leader of the deer farming research team at the Texas A&M University System Agricultural Research and Extension Center in Overton

The first study was done on fallow deer, a species native to the Mediterranean region of Europe and Asia Minor and grown on deer farms throughout Texas. This more recent study was done on red deer, a semi-domesticated species.

No similar studies either at Overton or elsewhere have been done to date on white-tailed deer, the wild deer species native to Texas.

"However, both species are very similar to white-tails in terms of antler and reproductive cycles. As a result, there are good reasons to believe that gossypol could also affect white-tailed deer," Randel said.

Because they are cheap, high-energy feedstuffs, whole cottonseed and cottonseed meal are commonly fed to both free-ranging and ranched deer in Texas, particularly in West Texas where cottonseed is particularly cheap and plentiful and grazing is at best Spartan.

Fourteen 2- to 3-year-old red deer stags from the Overton deer farming center were randomly allotted into three groups for the study. One group was fed whole cottonseed (WCS), the second group fed a cracked corn and soybean meal supplement without cottonseed, and a third group fed cottonseed coated with Easiflo.

All supplemental rations were formulated to be equal in nutritional value. Deer in all groups were provided all they would eat of the supplemental rations and maintained on bermudagrass pastures with free access to salt, mineral supplements, two pounds of alfalfa pellets and water.

On average, the WCS and Easiflo deer consumed about 4 pounds per day, or about 1.7 percent of their body weight, of rations.

At 28-day intervals, from February 2002 through November 2002, Randel and his research team collected blood samples, weights, body-condition scores, right and left antler measurements, scrotum circumference and testicular measurements on the deer. When antler growth ended, and the bucks began to rub the velvet off their antlers, the team collected sperm from the deer on 14-day intervals.

As expected from the previous fallow deer study, red deer antler weight was reduced in the WCS-fed animals compared to the control group, those eating corn/soybean meal supplements without WCS.

Average antler weight was about 2 pounds, 2 ounces in the WCS animals compared to about 3 pounds, 4 ounces in the controls. Surprisingly, though freely circulating gossypol in the Easiflo cottonseed fed deer was greatly reduced over time as the study progressed, antler weight for the Easiflo fed animals was about 2 pounds, 2 ounces, or nearly the same as those fed untreated WCS.

For the first two 28-day tests, blood gossypol levels were the same for the WCS and Easiflo animals. By the time of the third 28-day test, the gossypol for the Easiflo animals had leveled out, while gossypol levels in the animals receiving WCS rations continued to rise. When blood samples were taken at 211 days into the study, blood gossypol levels for the WCS animals were twice that of the Easiflo animals.

Though hunters often think in terms of antler harvest, a more important measurement in terms of deer and replenishment of herd numbers over time is male reproductive function. In the previous test with fallow deer, the blood testosterone levels of the WCS animals averaged approximately half that of the corn/soybean fed control group. With the red deer, although testis size was also reduced for the WCS and Easiflo deer, sperm concentration and volume were not significantly reduced; neither was motility.

“It is documented, however, that gossypol can cause damage to sperm at a molecular level that would not be measured by our tests,” Randel noted.

Randel also noted the study was done feeding large amounts of whole cottonseed. It is unlikely, he said, that complete rations composed of 10 percent cottonseed product or less would show detrimental effects.

“The intent of this research has been to eliminate the misuse of a valuable feedstuff by deer ranchers and wildlife managers. The intent was not to eliminate the use of this commodity at appropriate levels in complete, mixed supplements.

“More research is needed, however, to quantify exactly how much WCS can safely be included into the supplemental rations of these animals,” Randel said.

To correctly identify the safe level of WCS would require a very large number of deer, many test groups, more research staff and funding than are currently available, Randel said.