

SPECIAL REPORT

BREEDING DISCONTENT: SOY AND INFERTILITY

By Kaayla T. Daniel, PhD, CCN

Herbalists, midwives and witches have long known that certain plants and herbs have a contraceptive effect.¹ Scientists first recognized that plants contained such substances in 1926. Interest picked up in the mid 1940s when sheep were diagnosed with “Clover Disease.” The cause was three plant estrogens in clover, a plant closely related to soy. In female sheep, eating clover causes endometrial damage and cervical mucus changes associated with an inability to conceive. The problems are not unique to sheep; fertility problems from plant estrogen exposure have also been reported in birds, cows, mice, cats, and dogs as well as humans.²⁻¹⁴ Scientists have identified estrogenic activity in more than 300 plants,¹⁵ but only one commonly appears in the food supply – soy.

FAST TRACK TO EXTINCTION

The best known case concerns the cheetahs at the Cincinnati Zoo. In the 1980s Kenneth D. R. Setchell, Ph.D., discovered one reason the big cats were not reproducing. The female cheetahs were suffering from liver disease and reproductive failure caused by the high concentrations of genistein and daidzein found in the soy-protein portion of their feed. As Setchell put it, “Cheetahs have always been difficult to breed in captivity, but the additional insult of a diet rich in estrogens may well be one of the major factors in the decline of fertility in cheetahs kept in North American Zoos.”¹⁶

The soy estrogens in the cheetah feed not only disrupted hormonal activity but damaged the endometrium, making normal implantation and nourishment of a newly fertilized egg difficult. In contrast, cheetahs fed whole carcasses of beef, chicken and other animals at the DeWildt Research Centre in South Africa showed no signs of liver damage and had no problems breeding.¹⁷

At both the Fourth and Fifth International Symposia on the Role of Soy in the Prevention and Treatment of Chronic Disease, Setchell and other industry faithful reassured attendees that this is a cheetah problem and not a human problem. Cheetahs

are particularly susceptible to damage because they lack key liver enzymes needed to adequately deactivate estrogenic compounds. While this makes soy especially unsuitable for felines, Setchell's research provides ample evidence that soy estrogens are risky for animals of any species, including human animals. In the cheetah study, for example, he compares phytoestrogens with DES, a potent and dangerous estrogen with a chemical structure very similar to genistein, which has been withdrawn from agricultural use in the west. He writes:

“Despite concerns over the deleterious effect of diethylstilbestrol and other anabolic agents contaminating meats consumed by humans, it is apparent that the contribution of naturally occurring plant estrogens to the diet is rarely considered. This is surprising particularly as the level of phytoestrogens in foods is substantially higher than estrogen levels in animal tissues. Interestingly, it has been claimed that soy may be as beneficial as diethylstilbestrol as a growth promoter in animals.”¹⁸

CAT OUT OF THE BAG

Although the soy industry did its best to race the cheetah study to extinction, researchers over the past 25 years have steadily turned up evidence of soy's probable role in today's epidemic of infertility, menstrual problems and other reproductive disorders. A team of researchers from the Karolinska Institute in Stockholm working with Setchell, for example, concluded a study in the *Journal of Endocrinology* with the words:

“These findings have raised concerns about human exposures to phytoestrogens. The widespread use of soya beans as a protein food source makes it important to determine possible physiological effects of equol in man. The ‘contraceptive’ effect in animals suggests to us that it may be of interest to investigate the dietary habits and urinary excretion of equol in women with unexplained infertility or disorders of the menstrual cycle.”¹⁹

Similarly, Setchell once proposed that women with menstrual cycle disorders and fertility problems should look at their consumption of soy “in view of the various reproductive disorders in animals that have been associated with the ingestion of a variety of phytoestrogens.”²⁰

The soy industry has not publicized these recommendations. Instead, it has boldly promoted the adverse effects as beneficial – as the key to breast cancer prevention no less. An example of such a positive spin applied to alarming study results appears in a 1994 article published in the *American Journal of Clinical Nutrition*.²¹

Aedin Cassidy completed an in-depth study of six women of childbearing age who were given 60 grams of textured vegetable protein per day (containing 45 mg total isoflavones) for 30 days. Compared to controls, the soy feeding resulted in “significant biological effects,” including menstrual cycles lengthened by an average of two and a half days, an average 33 percent reduction of mid cycle levels of Luteinizing Hormone (LH) and an average 53 percent reduction of Follicle Stimulating Hormone (FSH). One woman saw her LH and FSH levels reduced to a mere 17 percent and 32 percent respectively of normal levels. LH and FSH are gonadotropins; they stimulate the gonads – in males the testes and in females, the ovaries. They are not necessary for life, but are essential for reproduction. Although none of the women in this short-term study stopped ovulating, the effects of the isoflavones continued for three months after they ceased eating the soy.

These findings clearly show that soy food consumption can disrupt a woman’s cycle and jeopardize her fertility. However, the study’s authors chose to deemphasize this finding in favor of speculation that the longer menstrual cycles experienced by the soy-fed women could result in lower lifetime levels of estrogen. This, in turn, was harnessed to the unproven theory that reduction in lifetime estrogen levels is the key to reducing breast cancer risk. They also suggested that soy isoflavones could be used prophylactically to prevent breast cancer in a manner similar to the liver-damaging drug Tamoxifen. The conclusion that made the 6 o’clock news – still widely cited by the media– is that soy reduces breast cancer risk.

SAME BUT DIFFERENT

A look at the first version of the Cassidy study provides a lesson in the ways that the soy industry co-ops scientific research. The earlier study was Aedin Cassidy’s 1991 PhD dissertation from Cambridge University in England. The latter, published in the

American Journal of Clinical Nutrition, won her worldwide recognition, kudos from the soy industry and a job at Unilever.

Although the data is the same, Cassidy's dissertation includes a lengthy discussion of the ways that soy isoflavones contribute to reproductive disorders and infertility. She states clearly that her findings with human subjects were consistent with the "pathological changes" observed in animals, including the infertile sheep afflicted with clover disease and links her own findings to earlier human studies showing increased incidences of menstrual irregularities among vegetarian women. Her summary directly addresses the issue of impaired fertility.

"The results of the present study provide evidence to show that the feeding of 60 g of soya protein per day to six premenopausal women over a single menstrual cycle resulted in significant biological effects. The plant oestrogens present in soya protein interfered with the mechanism responsible for ovulation . . ."²²

Other researchers have also reported soy-induced perturbances in menstrual cycles²³ and some have directly stated that "isoflavones influence not only estrogen receptor-related functions but the hypothalamo-hypophysis-gonadal axis."²⁴

SHOOTING BLANKS

Soy phytoestrogens also affect the fertility, the testosterone levels and probably the sex drive of men. Scientists first linked phytoestrogens with lowered sperm count and other reproductive problems in the 1940s when clover disease was diagnosed in sheep. Normal males became infertile, while castrated males -- known as wethers -- experienced teat enlargement and nipple discharge.^{31,32} Sperm production of rodents, primates and humans is similar and known to be disrupted by estrogens that either interact directly with the testes or that modulate plasma gonadotrophin or sex hormone concentrations.³³ Compared to rodents, humans produce relatively low numbers of sperm, so even small effects may impair fertility.³⁴ As it happens, the changes in sperm quality and quantity over the past 60 years loom large.

In 1992 Danish researchers reported that sperm counts had dropped 50 percent

worldwide between 1939 and 1990. The study was widely criticized, but a reanalysis confirmed the results. Other studies followed with reports that sperm counts have been going down at the rate of two percent per year since the 1970s. Sperm quality has also suffered.³⁵⁻⁴⁰ The most probable cause is a combined assault by the environmental chemicals in pesticides and plastics along with the dietary phytoestrogens from soy.⁴¹

Although men produce sperm throughout their lives, serious damage is most likely to be done during the first trimester of pregnancy, infancy and early childhood. Adults who care about their sperm might want to be cautious about soy consumption, however. Researchers at King's College in England who studied mouse sperm treated with the estrogens found in paint, beer and tofu found clear evidence that these natural and environmental estrogens all affected the sperm's ability to fertilize an egg. All three estrogens initially made the sperm friskier – a process known as capacitation – but then the sperm petered out before they could find an egg to penetrate.⁴²

THE LOW DOWN ON TESTOSTERONE

Researchers have also report lowered testosterone and higher estrogen levels in males who consume foods rich in soy estrogens.^{43,44} Scientists have even induced “testosterone deprivation” in animals simply by feeding them isoflavone-rich diets.^{45,46}

Just as soy industry spokespeople promote hormonal changes indicative of infertility as beneficial tools in the war against breast cancer, so they tout testosterone lowering as protective against prostate cancer and atherosclerosis.⁴⁷ Although the possibility that soy foods or supplements could prevent these deadly conditions makes headlines, few men hear that the downside is demasculinization. This is not just a macho thing, for testosterone is an important hormone with roles in growth, repair, red blood cell formation, sex drive and immune function.⁴⁸ Low levels of testosterone have also been linked to low thyroid, another unwanted and common side-effect of soy consumption.⁴⁹

Recently scientists at the University of North Carolina at Chapel Hill completed a study for the National Cancer Institute in which the soy-eating men experienced “nipple discharge, breast enlargement and slight decreases in testosterone.” The good news, according to lead researcher Dr. Steven Zeisel, was that nothing “serious” was found even though they administered doses up to 30 times what one might get from “normal

foods.” To reassure men, he stated: “I don’t think there are a lot of estrogenic worries. Your testicles will not shrink and you won’t have massive breast enlargement.”⁵⁰

As Anthony Colpo commented in www.theomnivore.com, “Gee, it’s such a relief to know that men won’t experience ‘massive’ breast enlargement from copious soy consumption. See, nothing to worry about fellas; you won’t end up looking like Anna-Nicole Smith up top, just a more modestly-proportioned Heather Locklear instead! As an added bonus, the testosterone reductions you experience won’t be reflected by a visible decrease in the size of your family jewels, so even the tightest pants will fail to reveal your declining testosterone status! As for nipple discharge, c’mon what’s a little lactation between friends?”⁵¹

STOPPING THE STORK

Might plants high in phytoestrogens such as soy, flax and alfalfa have value as contraceptive drugs? The World Health Organization once thought so. In the early 1970s, it funded a \$5 million study through the University of Chicago and sent researchers out in the field in search of all-natural contraceptives. The idea was to find a safe and effective alternative to the high-dose birth control pills of that era. Researchers visited dozens of native cultures to discover which herbs and plants were being used to prevent pregnancy, examined hundreds of plants and analyzed their phytochemicals. Although they found many contraceptive plants -- soy, flax and red clover among them -- they ultimately abandoned the project. Not because “natural” methods didn’t work, but because the side effects were similar to -- and just as serious -- as those of the birth control pill.⁵²

Breeding Discontent is a special report condensed from *The Whole Soy Story* by Kaayla T. Daniel, PhD, CCN (New Trends, 2005). For more in-depth information and references, see Chapter 29 of *The Whole Soy Story*.