

Annotated Bibliography – Plant Effects on Vertebrate Animal Fertility

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Biol 862 – Ecology Seminar (Plant and Animal Interactions)

de Freitas, T.G. et al. (2005) **Effect of *Ruta graveolens* L. on pregnant mice.** *Contraception* **71** :74–77.

Historically Ruta graveolens L. has been used in many countries, including Brazil, as an abortifacient. Scientists wanted to determine its effect on pregnancy. The active ingredient in Ruta graveolens was given to mice between the first and third day of pregnancy (DOP), between the fourth and sixth DOP or between the seventh and ninth DOP. The extract did not cause preimplantation embryonic loss or reabsorptions, instead the fetus was killed.

Farnsworth, N et al. (1975) **Potential Value of Plants as Sources of New Antifertility Agents I.** *Journal of Pharmaceutical Sciences* **64**(4):535-598.

A review article. This article focuses on possible antifertility compounds which can be found in the plant world. Farnsworth focuses on plants with a folkloric reputation as antifertility treatments. Another group of plants looked into were plants which are known to have a constituent which is theoretically applicable to female fertility.

Ganguly, Mausumi et al. (2007) **Antifertility activity of the methanolic leaf extract of *Cissampelos pareira* in female albino mice.** *Journal of Ethnopharmacology* **111**:688–691.

Cissampelos pareira is one of the many folk medicinal plants which are commonly used in India as an antifertility agent. This study evaluated the validity of the antifertility effect of the leaf extract. Cissampelos pareira leaf extract, was administered orally to albino mice. It was shown to alter the estrous cycle in female mice, by prolonging the length of the estrous cycle. A significant increase in the duration of the diestrus stage was

observed as well as a significant reduction of the number of litters in albino mice. Further analysis showed that the plant extract altered gonadotropin release (LH, FSH and prolactin) and estradiol secretion.

Harat, Z. et al. (2008) **Immobilization effect of *Ruta graveolens* L. on human sperm: A new hope for male contraception.** Journal of Ethnopharmacology **115**:36–41.

This article studies the contraceptive effects of Ruta graveolens L., which has been used as a male contraceptive in Iranian traditional folk medicine. Ruta graveolens was used to experiment on human sperm. Motility and viability of cells, DNA status, mitochondrial activity and sperm revival tests were carried out. The extract was shown to have sperm immobilization effects which to be dosage dependent. 100% of the sperms became immotile at a concentration of 100 mg/ml. This affect is partially reversible because after washing the sperm, motility was regained in $30.8 \pm 3.2\%$ of the sperm.

Khillare, B. and T.G. Shrivastav (2003) **Spermicidal activity of *Azadirachta indica* (neem) leaf extract.** Contraception **68**:225–229.

This study evaluated the concentration of aqueous extract of old and tender Azadirachta indica (neem) leaves necessary to effectively immobilize and kill 100% human spermatozoa within 20 seconds. The minimum effective spermicidal concentrations for tender and old leaf extracts was shown to be approximately 2.91 mg/million sperm and 2.75 mg/million sperm, respectively. No change was observed in morphology of the sperm head, mid-piece or tail. The effect of different concentrations of extracts (old and tender) on the percentage of sperm motility showed that with an increase in concentration, there is a linear decrease in percentage motility, becoming zero at a 3-mg dose within 20 seconds.

Maurya, R. et al. (2004) **Traditional Remedies for Fertility Regulation.** Current Medicinal Chemistry **11**:1431-1450.

A review. The purpose of this review is to provide an account of the studies carried out on traditional/folkloric plants which are used for fertility regulation. This paper discusses the status of scientific validations of their antifertility potential as well as identification of active principles during the last 28 years. Approximately 318 different plants are used worldwide, of which 227 plants are of Indian origin. So far, 74 plants have been screened for their anti-fertility potential, and 48 of them have been found to be effective.

Rodriguez-De Lara, R. et al. (2007) **Influence of supplemental dietary sprouted wheat on reproduction in artificially inseminated doe rabbits.** *Animal Reproduction Science* **99**:145–155.

Sprouted wheat contains great amounts of a phenol compound which stimulates reproduction in certain small wild herbivorous mammals. This study evaluates the effect of dietary sprouted wheat on reproduction in artificially inseminated doe rabbits. The number of young produced per doe was significantly greater in does fed sprouted wheat. Does fed sprouted wheat produced larger litters than those in the control group. Feeding sprouted wheat enhanced sexual receptivity and prolificacy in artificially inseminated doe rabbits bred in summer and autumn.

Shappira, Zvia et al. (1990) **Reduction of Rodent Fertility by Plant Consumption with Particular Reference to *Ziziphus spina-christi*.** *Journal of Chemical Ecology* **16**(6):2019-2026.

*Plants that are known to be an effective factor in human birth control may have similar effects on their natural mammalian herbivores. This study looks at ten species of plants utilized by Bedouins for birth control. Six plant species (60 %) were found to reduce reproduction rate in white female rats. The shoots and fruit of one of the effective species, *Ziziphus spina-christi*, postponed female puberty and significantly reduced offspring survival when offered to its natural herbivore, *Meriones tristrami*. Possible evolutionary reasons for this are that when the seeds of the plant are part of the herbivore diet, a certain percentage of the seeds will be dispersed and germinate, while the resulting population control of the animal achieved by its consumption of the seeds will prevent overgrazing.*

Short, R. E. et al (1992) **Effects of feeding ponderosa pine needles during pregnancy: comparative studies with bison, cattle, goats, and sheep.** J Anim Sci **70**:3498-3504.

In this study, experiments were conducted to determine the effect on the abortion rate caused by the feeding of dried pine needles (Pinus ponderosa; PN) to ruminants. The PN caused abortions when started after 116 days with the percentage of cows that aborted increasing linearly, and the interval to abortion decreasing linearly. The PN induced some abortions in cattle when fed for 1 or 3 days, but the abortion rate was greater when the PN were fed for longer periods of time. No goats or sheep aborted in response to PN feeding. Abortions were induced in buffalo and cattle that were fed PN. Low amounts of PN did not induce abortions, but showed some prophylactic effects. In all experiments cows that aborted had a retained placenta, and calf survival was dependent on maturity at the time of parturition.