

Effects of Pyrethroid Insecticides on Cattle Fertility

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Pyrethroid insecticides are commonly used in the beef cattle industry. Research with laboratory animals and case studies with livestock have suggested that these chemicals may reduce fertility. The objective of the following experiments was to determine if pyrethroids, cyfluthrin, and beta-cyfluthrin, have negative effects on cattle fertility. In the first experiment, Angus x Simmental bulls (n = 24) ranging from one to six years of age (BW = 1704 +/- 409 lb) were stratified by age and allocated to the following treatment groups: control (CON; n = 5), pour-on (POUR; n = 5), fly tag (TAG; n = 7), and pour-on and fly tag (POUR+TAG; n = 7). POUR bulls received 24 mL of the CyLence® pour on (1% cyfluthrin) by topical syringe, TAG bulls were ear tagged with two CyLence Ultra® fly tags (8% beta-cyfluthrin), and POUR+TAG bulls received both pour on and fly tag as per labeled instructions. Bulls were maintained by treatment group on non-adjacent pastures and semen was collected weekly for nine weeks. Semen was analyzed for overall motility, progressive motility, and morphology with the aid of computer-assisted semen analysis. Blood samples were also taken weekly from the tail vein for analysis of testosterone. All data were analyzed in MIXED procedure of SAS. There were no differences in overall motility ($P = 0.41$), progressive motility ($P = 0.60$) or in normal morphology percentages ($P = 0.41$) among treatments. The testosterone concentration did not differ ($P = 0.16$) between control and treated bulls. In the second experiment, Angus and crossbred cows (n = 123) were blocked by breeding date (April and July) and by breed, and randomly assigned to a control (CON; n = 61) or treatment group (POUR+TAG; n = 62). The POUR + TAG group received both pour-on and fly tag at label doses. Cows were synchronized with a seven

day CO-Synch+CIDR® program and bred by timed artificial insemination (AI) 66-72 hours from CIDR removal. Insecticide was applied to the treatment group at the time of CIDR insertion. Blood samples were collected via jugular venipuncture on day 10 and 17 post-AI to evaluate progesterone concentrations. Pregnancy evaluation was performed by rectal palpation in combination with real-time ultrasound at 35 days post-AI. All data were analyzed in MIXED procedure of SAS except for pregnancy data which were analyzed using the GENMOD procedure of SAS. The treatment group had decreased ($P = 0.03$) progesterone concentrations at day 10 when compared to control cows (5.51 vs. 6.40 ng/ml). Progesterone concentrations did not differ ($P = 0.94$) at day 17. No differences ($P = 0.65$) were observed in AI pregnancy rates between treated cows (45%) and control cows (40%). The pyrethroid fly tags and topical pour-ons used in these studies, when used according to label instructions, did not adversely affect cattle fertility.