

ERGOTISM IN DAIRY CATTLE - EFFECTS OF INGESTION OF ERGOTS FROM
CLAVICEPS PURPUREA

I.H. JANG*, J. van der TOL*, W.L. BRYDEN*, G.H. McDOWELL*, A.D. ROSS**,
B.M. CHRISTIE** and L.W. BURGESS***

Cases of 'idiopathic bovine hyperthermia' (IBH) described in dairy cattle from several areas of New South Wales during the autumn of 1986 apparently were attributable to contamination of feed grains with ergots from Claviceps purpurea (Burgess et al. 1986). The study reported here was conducted to assess responses of dairy cows to ingestion of ergots of C. purpurea.

Three lactating dairy cows, c. 10 weeks post partum and with similar liveweights and milk yields, were kept in tie-stalls in a semi-enclosed room. They were fed a basal ration (rolled barley:chopped lucerne, 60:40) in sufficient quantities to maintain liveweight and milk production at the start of the experiment. In addition, the cows were offered 1 kg/d long pasture hay. The basal ration was fed for 10 d (P1) then separated ergots of C. purpurea were added to the barley portion of the ration at the rate of 7.5 g/kg, air dry. Cows were fed ergot-contaminated grain for 10 d (P2) then cows were returned to the basal ration for a further 10 d (P3). Production parameters were measured daily, plasma hormones and metabolites were measured in samples collected via jugular vein catheters on days five to seven of each period and clinical parameters were measured on these three days. Responses to ingestion of ergots are summarised in the following Table which shows mean values for the three cows.

	P1	P2	P3		P1	P2	P3
feed intake (kg/d)	14.9 ^{de}	8.9 ^d	14.8 ^e	plasma insulin (mU/l)	23.5	15.6 ^b	33.6 ^a
liveweight (kg)	420 ^a	358 ^b	389 ^c	plasma prol (µg/l)	98.0 ^a	15.2 ^b	23.8 ^a
milk yield (kg/d)	16.7 ^a	12.4 ^b	16.8 ^a	plasma glucose (mM)	4.30 ^{de}	3.78 ^d	4.28 ^e
milk fat (g/kg)	39.3	45.9	45.8	plasma NEFA (µM)	250	680	270
milk protein(g/kg)	33.0	29.7	35.7	resp rate(breath/min)	25.9 ^d	21.8 ^e	30.0 ^d
				heart rate(pulse/min)	72.2 ^a	48.1 ^b	70.0 ^a

values differing have different superscripts: a,b,c P<0.05; d,e P<0.10

The results conclusively demonstrate that ingestion of the ergots of C. purpurea markedly affects productivity and induces changes in several physiological and clinical parameters in dairy cattle. The decreases in milk yield and liveweight followed a large reduction in feed intake and were associated with lowered plasma glucose and insulin and increased plasma non-esterified fatty acids (NEFA). Ingestion of the ergots decreased heart and respiration (resp) rates suggesting neurological effects of ergot alkaloids/toxins (Morehouse 1979). Decreased plasma prolactin (prol) is consistent with effects of ergot alkaloids on prol and the decreased prol may affect fluid exchange across the gut (Faichney and Barry 1986) and so explain intolerance to heat observed in field cases of IBH.

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* Dept. Animal Husbandry, University of Sydney, Camden, New South Wales 2570
** Veterinary Research Station, Glenfield, New South Wales 2167
***Dept. Plant Pathology and Agricultural Entomology, University of Sydney, New South Wales 2006