ACKNOWLEDGEMENTS We are grateful to Professor M. Mota, Department of Genetics, Estacao Agronomica National, Oerias, Portugal, for providing the seeds

Received 1 March 1993, revised accepted 24 September 1993

An ancient Egyptian pregnancy test extended to cattle

T. Veena and R. Narendranath

Department of Veterinary Physiology, Veterinary College, University of Agricultural Sciences, Bangalore 560 024, India

Based on clues provided in papyrii from ancient Egypt (2100–2200 BC), we attempted to devise a simple test to diagnose pregnancy in cattle. The test relies on the differential response in germination and shoot growth of wheat seeds to the urine of pregnant and non-pregnant cows. Our results show that germination and shoot growth of wheat seeds were suppressed by the urine of pregnant cows and this persisted for 2–3 months after parturition. However the urine of non-pregnant cows did not cause such inhibition. Such a differential response was not found to be due to pH. We suggest that these results would be important in developing a simple test to diagnose pregnancy in cattle.

IN a set of papyrii brought by Flinders Peterie to London during 1898 from excavations of Kahun in Egypt, there are details of several gynecological diseases and the diagnostic tests apparently being practiced during 2100–2200 BC[1] One among these suggests that the germination response of barley and wheat seeds to woman's urine could indicate the state of her pregnancy and even the sex of the growing foetus. It is stated that the germination of seeds and shoot growth of both the species serve as a positive test for pregnancy and a relatively enhanced growth of barley suggests female sex and that of wheat male sex[1].

Though there has been an attempt in the past to test the validity of this ancient practice[1], results are neither clear nor well known. We were prompted to extend this test to diagnose pregnancy in cattle and hence the present study.

Urine was collected from pregnant ($n = 9$) and non-pregnant ($n = 15$) cows between 0630 and 0830 hrs from the UAS Dairy, University of Agricultural Sciences, Bangalore. The pregnant cows were those that tested positive for pregnancy by rectal examination 40 days after insemination. The non-pregnant cows were grouped into (a) those that had calved within the past three months and (b) those for which at least three months had elapsed after parturition. These two groups were not inseminated after their last parturition. Five ml of diluted urine (1 ml urine made to 5 ml with distilled water) was added to each petri dish containing 15 wheat seeds; four such petri dishes were maintained for each cow and the percentage germination was recorded after two days and shoot growth after five days. A control group was maintained using distilled water. The pH of the diluted urine samples was also determined by a digital pH meter.

The germination and shoot growth of wheat seeds treated with cow urine reduced significantly compared to those treated with water (Table 1). However, the urine of the pregnant cows suppressed the seed germination (46.48%) and shoot growth (0.93 cm) significantly more than that of the group (b) of non-pregnant cows (75.04% and 4 cm respectively). Urine of

Table 1. Germination (%) and shoot growth (cm) of wheat seeds treated with water, urine of pregnant and of non-pregnant cows The pH of the urine of these cows is also provided#

		Germination (%)		Shoot length (cm)		pH	
Treatments	*n*	Mean	SE	Mean	SE	Mean	SE
Water	13	87 70[a]	5 13	6 43[a]	0 34	6 95[a]	0 75
Urine							
Pregnant cows	19	46 48[b]	4 24	0.93[b]	0 83	7 38[a]	0.40
Non-pregnant (> 3 months elapsed after calving)*	7	75 40[c]	6.99	4 00[c]	0 47	7 08[a]	0 37
Non-pregnant (within 3 months after calving)**	8	49 51[b]	6.54	1.27[b]	0 44	7.30[a]	0 39

* group (b) in the text, ** group (a) in the text, # values with same superscript are not significantly different (one way analysis of variance)

group (a) non-pregnant cows (that had calved within the previous three months) also suppressed the germination (49.51%) and shoot growth (1.21 cm) of wheat seeds and was on par with that of pregnant cows. In other words, urine of pregnant cows dramatically inhibited the germination and shoot growth of wheat seeds compared to that of non-pregnant cows. This inhibitory effect appears to persist for about three months after calving, though to a lesser extent and subsides later.

The diluted urine of all the three categories was found to have similar pH values (Table 1), indicating that the suppression of seed germination and shoot growth is not due to pH. We have not yet been able to identify the inhibitory factor. But the mammalian urine is known to contain auxins, the plant growth regulators that have unequivocal effect on germination of seeds[2,3]. In fact the human urine was one of the major sources for auxins[2,3] during early 1930s. It is likely that the enhanced levels of such hormones in urine during pregnancy of cows might be causing the observed inhibition of germination of wheat seeds.

Diagnosing the pregnancy of cows at an early stage is of considerable economic value in dairy management. The currently available laboratory techniques of diagnosing pregnancy in cattle are laborious, costly and not practicable in the rural areas of the developing countries such as India. In this context, a simple test based on the effect of urine on germination of seeds might hold great promise.

1 Jurgen Thorwald, *Science and Secrets of Early Medicine*, Droemersche Verlagsanstalt, Munich, and Thames & Hudson Ltd , London, Dumont Press Cologne, West Germany, 1962, pp 100–101

2. Kogl, F , Haagen-Smit, A J. and Erxleben, H , *Hoppe-Seyler's Z. Physiol Chem* , 1934, 228, 90–206

3 Schneider, E. A and Wightman, Auxins, F , in *Phytohormones and Related Compounds – A Comprehensive Treatise* (eds. Leetham, D S , Goodwin, P. B and Higgens, T. J V), Elsevier, North-Holland Biomedical Press, Amsterdam, 1978, vol. 1, pp 33

ACKNOWLEDGEMENT. We thank Drs Girija, Habilis, Uma Shaanker and N V Joshi for their encouragement, and Agarwal for help in editing an earlier version of the manuscript

Received 24 June 1993, accepted 29 September 1993

New find of acicular-radial and cauliflower-shaped calcite spheroids from the intertrappean beds of Jabalpur District, Madhya Pradesh

Vikram J. S. Lamba and D. Raghoober*

Mining Officer, Office of the Collector, Indore 452 001, India
*Boulingrin, Long Mountain, Mauritius

The present note records the occurrence of 'acicular-radial' and at places 'cauliflower'-shaped calcite spheroids from the intertrappean limestone of Jabalpur district, MP. X-ray diffraction studies confirmed that they were calcite.

THERE is a widespread occurrence of Intertrappean beds in the Lower Deccan Volcanics[1]. Occurrence of an intertrappean bed from Jabalpur district was first reported by Rao[2]. New occurrences of two distinct intertrappean beds termed Khamaria intertrappean bed and Barela intertrappean bed towards the south and north of river Narmada respectively are now known[3]. Limestone overlain by cherts constitutes the main litho-units in the area.

Calcite commonly exhibiting acicular, radiating habit occurs in the uppermost part of an intertrappean limestone bed, especially where the overlying cherts are missing (Figure 1). Calcite spheroids occur in all the localities under investigation, viz. Barela (23°06' N: 80°04' E), south of Khamaria (23°01' N: 79°54' E).

Figure 1. *a*, Acicular-radial calcite from the Khamaria intertrappean bed, Jabalpur district, MP. *b*, Cauliflower-shaped calcite spheroids from 2 km south-west of Manegaon, Jabalpur district, Madhya Pradesh.