The conception pattern of a Santa Gertrudis herd continually exposed to bulls over six years

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The reproductive performance of a beef breeding herd is frequently the most important factor affecting the success of any beef production enterprise (Topps 1977) and herd fertility is governed by nutrition (Entwistle 1984) as influenced by rainfall. The lifetime fertility of a breeder is said to be influenced by date of conception as a heifer (Donaldson 1968) and there are divergent opinions on optimum time for conception. The aim of this study was to determine the influence of time of conception as a heifer and rainfall patterns on the long–term conception pattern of a herd.

The study was on a commercial cattle enterprise, Avon Downs, situated at 20°25'S, 137°33'E on the eastern Barkly Tableland region of the Northern Territory. The 850 breeder cows observed were kept in one paddock (250 km^2) of predominantly Mitchell grass (*Astrebla spp.*) and Flinders grass (*Iseilema spp.*) native pasture, treeless and flat to slightly undulating. The period of useful pasture growth is on average 11 to 15 weeks commencing early January (Hart and Michell 1965). All cattle were individually identified and managed in the manner typical in the region. Bulls remained in the herd all year round and were culled and replaced according to standard station management practice. Breeders as heifers conceived from November 1995 through to June 1996. The reproductive performance of the herd was monitored from 1996 until April 2002.

The numbers of pregnancies occurring each month (standardized for herd size) were analysed with a linear model to determine which months were the most productive. There was a significant difference between all months ($F_{0.05,11,70} = 6.27$, $P<0.0001$). February had the highest mean pregnancy rate with 115.4 pregnancies per month, and September the lowest with 13.3 per month. When the pregnancy rate for each month was tested against the February mean with one–tailed Dunnet's tests (keeping the type I error rate at 0.05), two clear groups emerged: a 'wet/early dry season' group (comprising months December through to May) with higher pregnancy rates, and a 'mid to late dry season' group (June to November) with the lowest pregnancy rates.

The number of pregnancies per month is strongly positively associated with rainfall history. The strongest correlation exists with cumulative rainfall in the previous four months ($r = 0.737$, $n = 67$, $P<0.0001$). The most likely reason for this relationship is the effect of rainfall on pasture nutritive value and related improvement in breeder condition. The need for synchronizing conception patterns with rainfall patterns is particularly relevant in regions such as the Barkly Tableland where annual pasture quality is highly dependent on the timing of rainfall.

Further work on the data is planned to determine whether the seasonal patterns of pregnancies and, importantly, if the inter–calving intervals in the herd remain stable over time.

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