Topic 4 – Normal and sampling distributions

ENVX1002 Introduction to Statistical Methods

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Topic 4 Outline – Normal and sampling distributions

- Example
- Normal distribution
- Other continuous distributions
- Sampling distribution

Learning Outcomes

- Understand what a (probability) distribution is:
  - the properties of a continuous distribution.
- Use Normal Distribution to understand/describe data
  - Be able to standardise a Normal;
  - Calculate probabilities based on Normal Distribution using R.
- Know that there are other continuous distributions useful in hypothesis testing.
- Distinguish between population, sample and sampling distributions;
- Distinguish between a standard deviation and standard error of the mean;
- Describe the Central Limit Theorem;
- Use R and Excel to calculate the standard error and probabilities associated with sampling distributions;

Types of data

- Numerical
  - Continuous: yield, weight
  - Discrete: weeds per m^2
- Categorical
  - Binary: 2 mutually exclusive categories
  - Ordinal: categories ranked in order
  - Nominal: qualitative data

Example

- The gestation period (in days) for American Simmental cattle is distributed with mean 284.3 and standard deviation 5.52. How often is a calf born a week early?

Wray et al. 1987

J Anim Sci. 1987 Oct;65(4):970-4. doi: 10.2527/jas1987.654970x.

Analysis of gestation length in American Simmental cattle

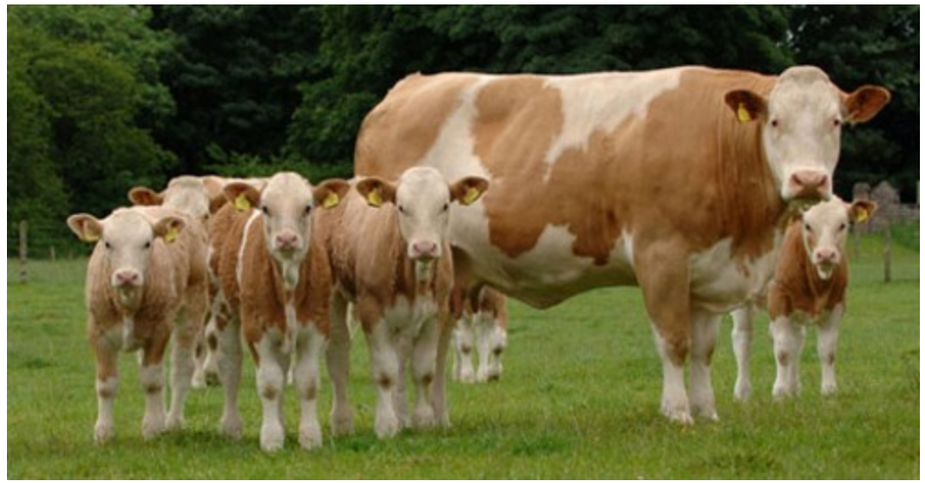
N R Wray [1], R L Quaas, E J Pollak

Affiliations + expand

PMID: 3667470 DOI: 10.2527/jas1987.654970x

Abstract

Records of gestation length (71,461) for Simmental cattle were distributed with mean 284.3 d and standard deviation 5.52 d. Gestation length was found to increase with percent Simmental and was 1.9 d longer for calves born to mature dams than for those born to heifer dams. Bull calves experienced gestation lengths 1.5 d longer than heifer calves. Sire, maternal grandsire, residual and total variances were estimated to be 2.42, .58, 22.78 and 25.78 d2, respectively, by Henderson's Method III. Heritability of gestation length was calculated to be .374 from the sire variance and .09 from the maternal grandsire variance. Direct additive genetic variance was considered to be of greater importance than maternal additive genetic variance. Correlations between the evaluations of sires for gestation length and heifer calving ease, birth weight and weaning weight were .26, .26 and .13, respectively.



Thanks!

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