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不同额外随机效应对估计协方差函数的影响 Influences of Different Additional Random Effects on Estimating Covariance Functions

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摘要 将6个世代的686头SD-Ⅱ系猪的生长记录资料用于研究,分别将窝效应和个体效应作为额外随机效应时对估计加性遗传和永久环境协方差函数的影响.配合将年龄的勒让德多项式作为自变量的随机回归模型,用平均信息约束最大似然(AIREML)法估计.结果表明,窝效应只能反映部分永久环境效应,估计协方差函数时需配合全阶多项式;而将个体效应作为额外随机效应,降阶配合即可.降阶配合涉及的参数较少,同时可以缓和协方差估值间的差异.对协方差函数的意义和应用做了讨论。

Abstract:Growth records of 686 pigs of SD- Il Swine Line over 6 generations were used to study the influence of litter effect and animal effect,which was used as different additional random effect,on estimating additive genetic and permanent environmental covariance functions.A random regression model with Legendre polynomials of age as independent variables was used to estimate the covariance functions by restricted maximum likelihood employing the average information algorithm (AIREML).The results showed that litter effect only reflected part of the permanent environmental effects and full order fit was necessary to estimate the covariance functions.However,a reduced order fit was feasible using animal effect as additional random effect.Moreover,it involved less parameters and smoothed out differences in estimates of the covariances.Significance and application of covariance functions are discussed.

关键词 额外随机效应 协方差函数 经度数据 约束最大似然法 随机回归模型 Key words additional random effect covariance functions longitudinal data restricted maximum likelihood random regression model

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