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Germination capacity of *Zoysia japonica* seeds in the droppings of cattle and goats

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Key words: *Zoysia japonica*, germination capacity, dropping, cattle, goat

Introduction *Zoysia japonica* is a perennial grass distributed throughout most islands of Japan, the Korea Peninsula and the Liaodong Peninsula and Jiaozhou Peninsula of China (Dong *et al.* 2001). This species is not only favorable herbage, but also an important turf grass, commonly called Japanese or Korean lawngrass. *Z. japonica* is the only species that can be used to establish turf by seeds in *Zoysia* genus. But the wild seeds of *Z. japonica* are in a dormant state and must be treated before using. In the *Z. japonica* grassland ecosystem, cattle and goats can affect the germination capacity of *Z. japonica* seeds by eating and ingesting them. In this study, the germination capacity of *Z. japonica* seeds in droppings of cattle and goats was studied.

Materials and methods Droppings of goats and cattle were collected from *Z. japonica* grassland in Liaodong Peninsula of China in July of 2005 when *Z. japonica* seeds were mature. At the same time, *Z. japonica* seeds were also collected from reproductive tillers in the same site. Droppings and seeds were sun dried and stored. Seeds that were collected from reproductive tillers and recovered from the droppings of cattle and goats, considered here as control and separate treatments respectively, were tested for germination in May of 2006. For each treatment (control seeds, seeds in droppings of cattle and goats) five replications of 100 seeds were tested (Han *et al.* 2000). The germination rate, germination potential, average germination time and vigor index of *Z. japonica* seeds were calculated and then analyzed using one-way ANOVA.

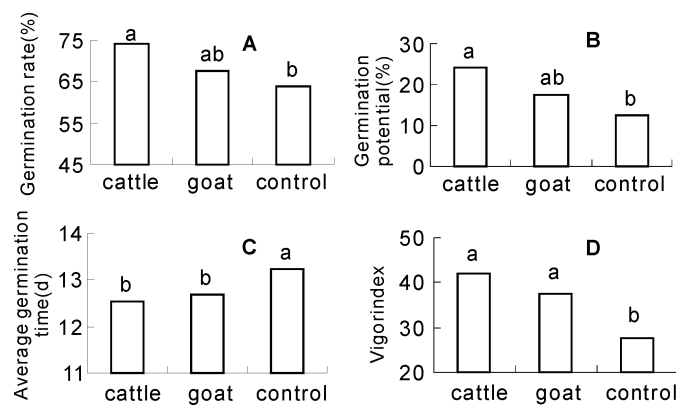


Figure 1 Germination rate (A), germination potential (B), average germination time (C) and vigor index (D) of *Z. japonica* seeds in droppings of cattle and goats. (Bars with different lower case letters are significantly different at $P < 0.05$.)

Results Germination rates, germination potentials and vigor index of seeds all responded similarly to the treatments (control, cattle and goats). The highest values of germination rates, germination potentials and vigor index of seeds were in the droppings of cattle, followed by those of goats, with the lowest found in the control seeds (Figure 1 A, B, D). The average germination time of seeds was lowest in the droppings of cattle, and highest in the control (Figure 1 C). The germination rate and potential of seeds in the droppings of cattle were both significantly ($P < 0.05$) higher than those in the control. The average germination time and vigor index of seeds in the droppings of cattle and goats were both markedly ($P < 0.05$) shorter and higher than those in the control, respectively.

Conclusions After *Z. japonica* seeds were eaten and digested by cattle and goats, the germination rates of *Z. japonica* seeds in the droppings of cattle and goats were significantly increased to 74.12% and 66.77%, germination potentials to 24.34% and 17.72%, and vigor indexes to 41.86 and 37.38, respectively. The average germination times of *Z. japonica* seeds in the droppings of cattle and goats were markedly shortened to 12.53 and 12.70 days, respectively.

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