（学位第３号様式）

学 位 論 文 要 旨

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題　目	Studies on production and grazing utilization of *Sorghum* spp. in Southwestern islands （南西諸島におけるソルガム属の生産と放牧利用に関する研究）

The study was conducted to establish the forage production and utilization system in the limited land by clarifying about productivity and characteristics of *Sorghum* spp. in Okinawa prefecture. Cultivation system and grazing method was examined in consideration for Hydrogen cyanide potential (HCNp).

1. Productivity and nutrition value of sorghum and Sudangrass was evaluated. Nutritive yield was equivalent to the recommended pasture varieties in Okinawa, and high productivity by harvesting once or twice was showed. Therefore, it was considered that *Sorghum* spp. was suitable to environment for cultivation in Okinawa and short-term forage production system.

2. Optimum stage for utilization and the influence of topdressing were investigated about four different varieties (Grain type: Gs, Sorgo type: Fs, Sudan type: Bs, Sudangrass: Ss). Digestible dry matter (DM) yields increased up to after heading in Gs and Fs, while they remained at the same level after boot stage in Bs and Ss. HCNp level decreased with maturity to reach the safe level for animal feeding after 4-6 weeks after germination. Topdressing showed a tendency to increase in DM yield. However, the harvest should retard to three weeks after topdressing to secure the safe level of HCNp.

3. Pasture productivity of *Sorghum* spp. under short-term grazing was evaluated. Effect of grazing intensity on herbage intake and HCNp intake were examined. Herbage production, intake and utilization were no way inferior to the recommended varieties for grazing. It was suggested that *Sorghum* spp. pastures should be used under heavy grazing to inhibit the increase in HCNp intake and improve pasture productivity and herbage utilization rate.

4. Influence of canopy structure and grazing intensity on the ingest pattern by grazing animal was discussed. The vertical distribution of HCNp showed the similar value between strata in vegetative stage. While, it showed a tendency to increase progressively with higher stratum in boot and heading stage. Thus, it was suggested to intake herbage up to lower stratum for restricting HCNp intake to a minimum. Effect of grazing intensity on herbage intake, defoliated stratum and ingredient intake were investigated. Most heavy intensity showed the highest herbage intake rate and the lowest HCNp intake. Furthermore, the effects of canopy height and grazing intensity on intake pattern and HCNp intake during the early grazing period and trampling loss were determined. It was clarified grazing animals intake downward about 40% from the crown in spite of canopy height. HCNp intake for a few hours after grazing started showed a tendency to increase in early heading stage with high canopy height. The trampling loss showed a tendency to increase with higher canopy height and grazing intensity. It is suggested that the increase of grazing intensity up to about 167-333 head/ha/day restrict HCNp intake and improve pasture productivity.

5. Effect of cutting height (25, 50, 75cm) on the productivity was investigated. Lower cutting height showed higher DM yield and lower HCNp.

From the result, the appropriate cultivation and grazing system of *Sorghum* spp. to enable the securing of the high yield and lower HCNp intake were suggested under short-term production system.