

最終試験結果の要旨	
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実施年月日	令和4年7月22日
試験方法（該当のものを○で囲むこと。） <input checked="" type="radio"/> 口答 <input type="radio"/> 筆答	
<p>主査及び副査は、令和4年7月22日の公開審査会において学位申請者に対して、学位申請論文の内容について説明を求め、関連事項について試問を行った。具体的には別紙のような質疑応答がなされ、いずれも満足できる回答を得ることができた。</p> <p>以上の結果から、審査委員会は申請者が大学院博士課程修了者と同等以上の学力ならびに識見を有するものと認め、博士（農学）の学位を受けるに必要な十分な資格を有するものと認めた。</p>	

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<p>[Question 1] In which areas and how many areas are these <i>Urochloa</i> species cultivated in the world?</p> <p>[Answer 1] <i>Urochloa</i> grass is extensively cultivated in many areas of the tropical and subtropical regions such as Africa, Central and South America, Oceania, East Asia, and Southeast Asia. Brazil alone cultivates about 99 million hectares and Thailand cultivates about 200,000 hectares of <i>Urochloa</i> grass.</p> <p>[Question 2] Did you evaluate the nutritive value of these <i>Urochloa</i> species? What is the nutritive value of these <i>Urochloa</i> species as compared with the other tropical grass species?</p> <p>[Answer 2] Yes, I have some nutritive value information about these cultivars. OKI-1 has pretty high <i>in vitro</i> dry matter digestibility, approximately 66%, more than Kennedy (63%), Mulato II (60%) and Basilisk (57%). In addition, it has 5% crude protein, 1.2% crude fat, 36% crude fiber, 10% ash, 48% nitrogen free extract, 44% acid detergent fiber, 73% neutral detergent fiber, 6.7% acid detergent lignin, 37.8% cellulose, and 28.3% hemicellulose, which are similar to other commercial cultivars. Cultivar Br-203 exhibited approximately 7% crude protein.</p> <p>[Question 3] Do you have some ideas to promote these novel cultivars in Thailand?</p> <p>[Answer 3] If an excellent cultivar is developed in Thailand, it spreads all over the country with the support of the government. For example, Br-203 was introduced several years ago, the Thai government, which is the Department of Livestock Development, has begun to promote seed production recently.</p> <p>[Question 4] As for comparing the seed germination in Chapter 2 and Chapter 4, for example, cultivar OKI-1, there is a considerable difference in the seed germination percentage. After that, I have a question. Are these seeds still in a dormancy period?</p> <p>[Answer 4] Yes, it is. Generally, <i>Urochloa</i> seeds are in dormancy for about six or seven months after harvest. Therefore, the seeds used in Chapter 2 and Chapter 4 were in a dormancy period.</p> <p>[Question 5] The germination percentage of seeds harvested in a cultivation experiment in Chapter 2 is 70 to 80%. However, the seed germination percentage in a dormancy breaking experiment in Chapter 4 is lower than the values in Chapter 2. What is the difference?</p> <p>[Answer 5] The measurement of seed germination percentage in Chapter 2 was conducted in Thailand in accordance with the seed test protocol of the International Seed Testing Association (ISTA), 2011 for <i>Urochloa ruziziensis</i>. The seeds used in Chapter 4 were brought from the Thailand to Okinawa and stored in a refrigerator at 5 °C. I think the seed quality was deteriorated which resulted in a lower seed germination in Chapter 4.</p>	

[Question 6] What is the best method for seed harvesting of *Urochloa* species and why?

[Answer 6] In my opinion, the three selected methods that were used in this study are suitable for smallholder farmers. It all depends on the ability to manage time, labor, and costs of seed growers. However, I recommend allowing ripe seeds to fall into a nylon net sheet stretched as a receptacle positioned beneath the seedheads. Collecting seeds every five days or more frequently is suitable for hand-harvesting of seed in the two new *Urochloa* cultivars. Because this method can achieve higher seed production, harvest seeds more conveniently, and reduce the cost and time spent on handling seed harvest.

[Question 7] What are the best climatic factors and soil types for successful seed production of *Urochloa* species?

[Answer 7] *Urochloa* grass can be grown in different climates. The grass is well adapted to a wide range of climatic conditions in Thailand. The annual rainfall should be above 700 mm, but there should not be much around the seedhead emergence period. The temperature should be above 19 °C for successful growth and seed production of the grass species. *Urochloa* spp. can adapt to a wide range of soil types, from poor acidic soils to highly fertile neutral soils. The cv. 'OKI-1' and cv. 'Br-203' exhibited edaphic adaptation in terms of growth and productivity when planted in many areas in Thailand. However, these grasses need well-drained soil.

[Question 8] Is it not dangerous to use concentrated sulfuric acid for seed processing?

[Answer 8] According to the protocol of ISTA, they use it for some grass species, including *Urochloa* spp. for scarifying hard seed-coat. The processing is done by seed companies rather than a farmer.

[Question 9] When did you do a germination test after harvesting? How long have the seed germination viability?

[Answer 9] Seed harvesting in all experiments was done in December, and germination tests were done in March of the following year in Thailand, and May in Okinawa. I did not investigate it. I think the seed validity of *Urochloa* spp. will become an issue in the future.

[Question 10] Does this *Urochloa* species have the salt-tolerant ability?

[Answer 10] It is well known that this species has some salt tolerance ability.

[Question 11] Do you have some information about the pasture persistence of some *Urochloa* species?

[Answer 11] In Thailand, most farmers renovate the *Urochloa* species pasture every 4 to 5 years.

[Question 12] How much is the price of the popular *Urochloa* seed in Thailand?

[Answer 12] As for *Urochloa ruziziensis*, cv. Kennedy, it is 150 Thai Baht per kg (about 500 Japanese yen per kg).