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A study on the efficient method of removing kudzu vines

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Background and Objective

- Kudzu (*Pueraria lobata*) is distributed throughout Asia as well as the United States and Switzerland.
- It is a perennial plant that is resistant to cold and does not freeze to death even in winter, and most of them survive as stems underground. In addition, it grows well in salty beaches, and it is difficult to distinguish the age of trees because it does not form tree-rings like woody plants.
- The rapid spread of kudzu vines due to forest development and increased deserted and fallow lands**,** causes problems about planted trees damage and desecration of the roadside landscape**.** Therefore these are emerging as social issues.
- In the case of existing physical control, work efficiency is reduced due to excessive excavation of kudzu roots. Accordingly, this study was carried out for the purpose of developing a control method considering the physiological and ecological characteristics of kudzu vines.

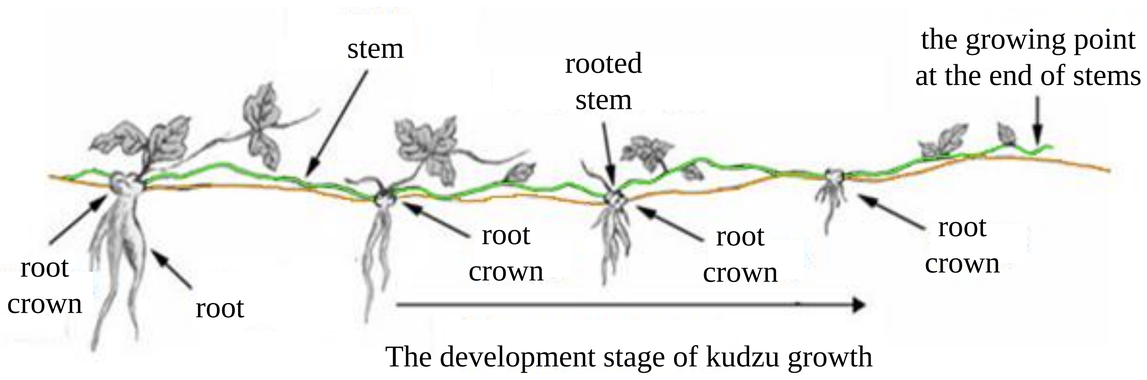
Materials and Methods

❖ The establishment of effective study sites for each method of removing kudzu vines

- For the treatment by kudzu vines control methods, three types of research sites were prepared.
- After working with brush cutters by setting the 10 × 10 m area of the weeding, the number of individuals reoccurring in the main head was investigated. And in the case of cutting the cross-section of root crowns and cutting below 5 cm of root crowns, 50 root crowns were found and tested.

❖ Concept of the root crown

- The part where the kudzu stems generate (No kudzu stems generated in the roots)
- The root crowns is slightly exposed to the ground or located in the underground soil.
- The node of the kudzu stem part grows as an independent entity through apoptosis.



The development stage of kudzu growth

❖ Life history of kudzu

- Early stages of growth: Bud comes out and sprouts in some of root crowns **(March - May)**
- The period of active growth and vigorous leaf growth **(June - early July)**
- Consumption of its own nutrients to produce stems and leaves from its roots (the right time of removal above ground)
- Flowers and fruits open and root (perennial stem nodes) formation period **(late July - August)**
- The nutrient recovery period: Changing the nutrient storage stage for root and next year's growth **(September)**
  ※ Chemical control period: Differentiation of the period according to the type of herbicides
- Preparation period for dormancy: When the stem grows slowly and leaves die in the first frost **(October - November)**
  ※ Blocking the nutrient accumulation function by removing stems from the above-ground stem
- Dormant period: Check the occurrence of black spots on the entire leaf and death **(December - February)**

Results and Discussion

❖ Effectiveness of removing kudzu vines

- During the test treatment for each method of removing kudzu, with 52 plants (100 %) during simple weeding > 48 plants (96 %) during cross-section cutting of root crowns > 4 plants (8 %) during cutting below 5 cm of root crowns, when the effect of removing kudzu was highest.
- The average number of kudzu stems generated by each treatment was 6.1 for above ground weeding work, 6.5 for removing the upper part of root crowns, and 6.9 for cutting below 5 cm of root crowns, the number of stem regeneration between treatments was not significantly different.

<The amount of reoccurrence in kudzu stems by methods of removing kudzu vines>

treatment method	the number of treated Individuals	the number of reoccurrence (%)	the number of non–occurrence (%)	the number of reoccurrence of kudzu stems
above ground weeding	52	52 (100 %)	0 (0 %)	6.1
cross-section cutting of root crowns	50	48 (96 %)	2 (4 %)	6.5
cut below 5cm of root crowns	50	4 (8 %)	46 (92 %)	6.9

<Weeding>

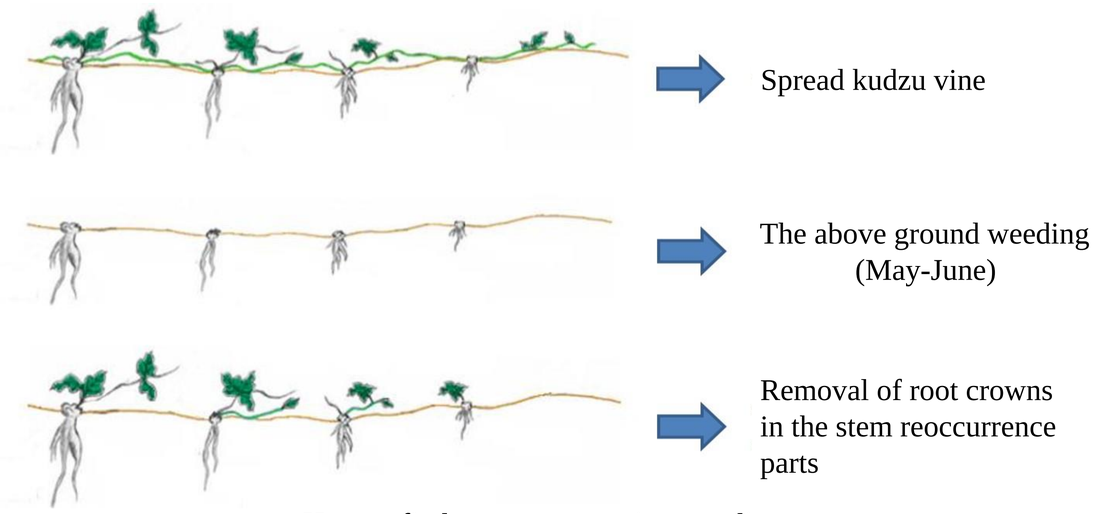
<Cross-section cutting of root crowns>

<Cut below 5cm of root crowns>

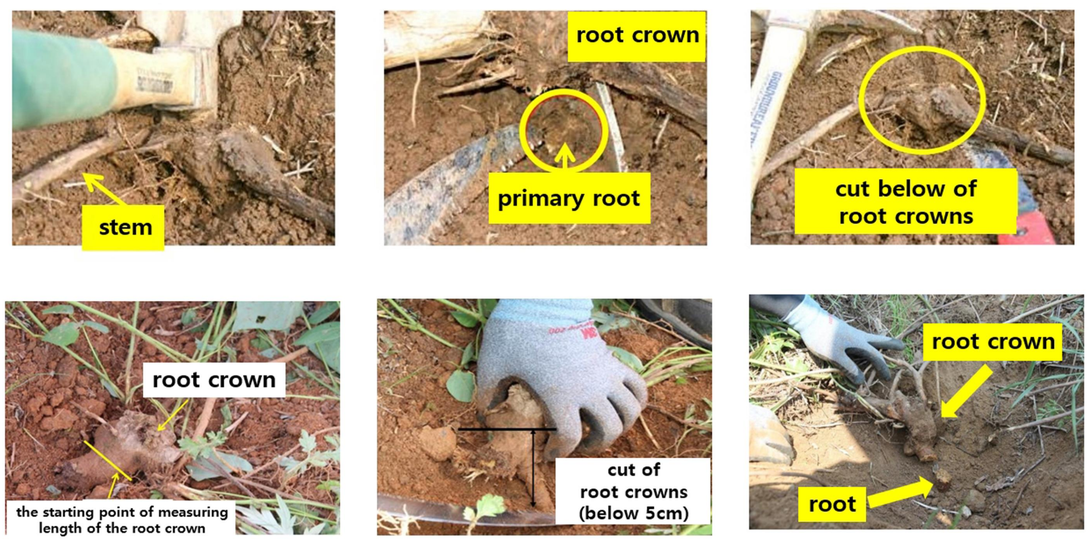
※ The red circle has a reoccurrence of kudzu stems. The yellow circle didn't have kudzu stems.

❖ How to physically remove kudzu vines and find root crowns

- Existing physical control work reduces labor intensity and work efficiency a lot by excavating roots excessively deep into the soil.
- Basically, kudzu stems occur in root crowns, and by cutting below root crowns, it is analyzed that no more kudzu stems are generated.



<How to find root crowns using weeding>



<Suitable way for removing root crowns>

- It is important to implement kudzu control work from a long-term perspective as it is possible to control the spread of kudzu through continuous control work rather than one-time work.