Removing seed coat tissues improves the germination rate, enabling seedling propagation to achieve the planned management of sago palms

Production | Implementation | Item: Sago palm | Labor productivity enhancement Resource management

Outline

Applying a simple physical treatment to remove the seed coat tissues from sago palm seeds, dramatically increases the germination rate, enabling seedling propagation. This method can increase the survival rate in the field by more than 30% compared with that of the conventional method of transplanting suckers*, enabling planned resource management.

* Sucker: part of the young shoot where a portion of the rhizome appears above ground.

Background/effect/note

The sago palm grows in Southeast Asia and accumulates more than 200 kg of starch (dry weight) in its trunk. It is a resilient plant capable of adapting to problematic soils such as saline and acidic soils. Sago palm starch is used as an ingredient in allergy-preventive foods and meals for older adults. Traditionally, it has been harvested from natural forests; however, in recent years, resource management has become necessary to meet increasing demand. Challenges have emerged, including the low survival rate in the field (~60%) with vegetative propagation (sucker transplanting) and the low seed germination rate (~20%). Therefore, we developed a method to remove seed coat tissues (pericarp and sarcotesta) that contain germination inhibitors (Fig. 1) prior to sowing. This method increases the germination rate to over 90% (Fig. 2), and few seedling deaths are observed after transplantation. The same effect is achieved by excising the seed coat tissues above the embryo (Fig. 3). A field demonstration was conducted at a university in Indonesia using this method (Fig. 4), and the application of this technology is expected in Malaysia, Thailand, the Philippines, and Brunei. This technology was adopted by the FAO Technical Corporation Program (TCP) in Papua New Guinea, with a sago nursery established in East Sepik Province in May 2023 (Fig. 5) and a new planting field of 1 hectare opened in August of the same year.

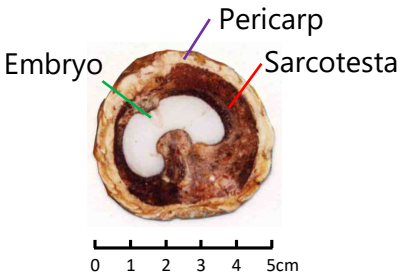

Fig. 1. Transverse section of sago palm fruit

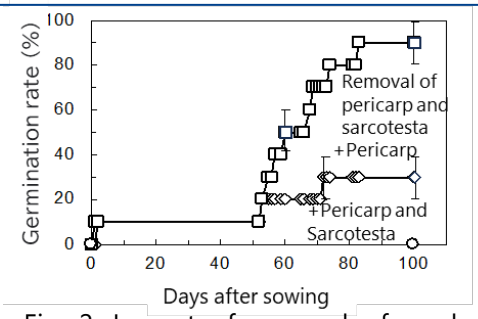

Fig. 2. Impact of removal of seed coat tissues on germination rate

Fig. 3. Pericarp and sarcotesta above embryo removed

Fig. 4. Seedlings planted in a field (Southeast Sulawesi, Indonesia)

Fig. 5. Sago Nursery of FAO TCP

Technical details:
https://icrea95.wixsite.com/labo/sago-palm-studies

Contact
ehara.hiroshi.h9@f.mail.nagoya-u.ac.jp

NAGOYA UNIVERSITY