

## Machinery for corn cultivation

### Increased efficiency of small-scale agricultural machinery

**F**ARMERS involved in corn cultivation usually do not have access to preharvest equipment such as tiller, planter, weeder-ridger, and fertilizer applicator. Generally, they only use the hand tractor for land preparation, while planting and weeding or ridging are performed manually. Therefore, their work and field capacity remain very low. To support corn cultivation, several preharvest machinery equipment, such as planter (pulled-push type model RIP-2R-M1 and stick type model M1VL) and weeder-ridger (model IRRI-M5), were developed by the Indonesian Cereals Research Institute (ICRI) and their application evaluated at the farmer level. The result showed that all machine prototypes can be

assembled locally since the components and materials used are available at small industries within the vicinity of the farmers' village. As a result, the price of the machines has become relatively cheap and the farmer or farmers' groups can now afford to buy them. The local industries can also play an important role in developing the machines. To empower the local industries, the prototypes and their design figures should be provided.

News source: **Indonesian Cereals Research Institute**

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## Controlled-release fertilizer (CRF) for lahar-affected and coarse-textured agricultural soils

**C**ROPS are unable to optimally use fertilizers applied on lahar-affected or coarse-textured soil due to leaching and volatilization of nutrients. Hence, researchers developed the controlled-release fertilizer (CRF) for these kinds of soil to provide plants with nutrients when needed without incurring high labor cost. CRFs are inorganic fertilizer granules sprayed with coating material that allows them to release plant nutrients at a controlled rate.

The following types of CRF were developed: a) diammonium phosphate (DAP) containing 13% nitrogen and 34% phosphorous; b) potassium chloride (KCl) containing 42% potassium; c) complete fertilizer containing 10-8-8% NPK; and d) urea containing 37% N. Pot tests for onion, rice, and tomato were conducted using clay pots filled with 8-kg lahar deposit. Results of laboratory tests for release patterns of nutrients and efficacy tests of CRF for onion, tomato, and rice revealed the following:

- Substituting the recommended rate (190-70-70 kg  $\text{NP}_2\text{O}_5\text{-K}_2\text{O}$ /ha) of commercially available fertilizer (CAF) with one-half CRF increased yield of onion by 144%. Applying CRF at full

recommended rate increased yield of onion by 259%.

- In tomato, substituting the recommended rate of CAF (90-60-60 kg NPK/ha) with half or full rate of CRF did not produce any yield.
- In rice, yield was higher by 50% when CRF was applied at recommended rate (150-35-35 kg NPK/ha).
- DAP and complete fertilizer release of nutrient contents were faster in the lowland than in the upland condition.
- Urea released nitrogen faster in soil in the upland, but released nitrogen faster in lahar in the lowland.

News source: **Philippine Council for Agriculture, Forestry and Natural Resources Research and Development**

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# Identification and cloning of antifungal gene

## Enzyme activity of chitinase, growth pattern, and RNA synthesis of *Trichoderma harzianum*

**F**UNGAL DISEASES cause a significant decrease in yield of estate crops. Diseases such as basal stem rot on oil palm caused by *Ganoderma* sp., leaf rust on Arabica coffee by *Hemillia vastatrix*, and cocoa and rubber wilts by *Phytophthora* spp. are the most important fungal diseases of estate crops. Chemical control against these diseases is considered ineffective and poses negative effect to the environment. Therefore, genetic engineering by transferring resistance genes to create a plant resistant to the disease becomes one of the prospective solutions. Non-pathogenic fungi such as *Trichoderma* sp. and *Gliocladium* sp. are known as biofungicides due to their chitinase and Beta-1.3 glucanase enzyme activities that are able to hydrolyze the pathogenic fungal cell walls. In genetic engineering, good RNA is indispensable. Therefore, constructing cDNA library is an important step for identifying and cloning the best quality of antifungal genes. In the experiment, kinetic

growth and total RNA isolated from *T. harzianum* in liquid culture (PDB) were studied. The result showed that the activity of chitinase isolated from *T. harzianum* and grown on PDB media with or without chitin was not significantly different. Mycelia growth pattern of *T. harzianum* on liquid media (PDB) showed sigmoid pattern with DT (doubling time) between 12 and 24 hours, and the peak growth occurred at the age of 5 days. The total synthesis of RNA at several growth ages indicated that the total RNA content significantly increased at 48 hours after inoculation, while the highest result was reached at 72 hours culture. These kinetic data are important reference in selecting *Trichoderma* culture as a source of total RNA and RNA isolations.

News source: **Indonesian Biotechnology Research Institute for Estate Crops**

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## Golden dew drop extract to control Giant Mimosa

**M**ETHANOL CRUDE EXTRACT of golden dew drop (*Duranta repens* Linn.), an ornamental shrub of Verbenaceae, shows high inhibitory effect on germination and growth of many weed species. The extract also shows high bioactivity, and can even be kept in natural condition for 245 days after extraction. To find out the agricultural utilization of the plant, the effect of water extract and ground leaves of golden dew drop on the growth of Giant Mimosa seedlings in agar media was investigated. The results showed that water

extract from 1.0 g of leaves had a high inhibitory effect of 99% on the root growth of the tested seedlings, while 1.0 g of ground leaves had 78% inhibitory effect on the root growth of the seedlings.

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## Rapid rotational grazing to control endoparasites

**O**NE of the major problems in goat raising is internal parasites. Anthelmintics are effective in controlling parasites but they are expensive. Besides, animals develop resistance in prolonged use.

Researchers, therefore, considered rapid rotational grazing as an effective alternative to total dependence on anthelmintics in controlling internal parasites in goats. The study determined and compared changes in weight, packed cell volume (PCV), and fecal egg count (FEC) among animals exposed to Rapid Rotational Grazing (RRG) and the Set Stock (SS) group.

Animals in the RRG group were allowed to graze rotationally on a 2-ha area, subdivided into ten paddocks. The grazing period was 3.5 days on each paddock. On the other hand, animals in the SS group were allowed to have free access to a 2-ha fenced pasture area.

Following are significant findings of the study:

- ❑ Animals in the RRG treatment had lower and more tolerable nematodal infection based on fecal egg count when compared to the SS group.
- ❑ Packed cell volume (PCV) of the animals was higher in the RRG group. This means that there was lower loss of blood due to lower internal parasitism.
- ❑ Frequency of deworming was reduced six times with RRG.
- ❑ Pasture quality under RRG was maintained and better utilized because overgrazing was minimized.

News source: **Philippine Council for Agriculture, Forestry and Natural Resources Research and Development**

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