

**Labor-saving effect of several mulching materials and chemical agents on the tuber yield of *Dioscorea batatas* Decne.**

Nat'l Ins. Horticultural & Herbal Science, RDA<sup>1</sup>

Dept. of Plant Science, Chungbuk National University<sup>2</sup>

Su-Hwan Lee<sup>\*,1</sup>, Young-Guk Kim,<sup>1</sup> Beom-Heon Song<sup>2</sup>, Sin-Hee Han,<sup>1</sup> Young-Seob Lee<sup>1</sup>

Jin-Taek Kwon,<sup>1</sup> Young-Sup Ahn, Geum-Soog Kim<sup>1</sup> and Chung-Berm Park<sup>1</sup>

**Objectives**

Yam(*Dioscorea batatas* Decne.) is a major medicinal tuber crop and also cultivated as food in Korea. The increasing demand for health food to enjoy well-being has led to developing new agronomic practices for large-scale production. Propagation in the yam consists of sliced tuber minisets and bulbils. Harvested tuber becomes both products and propagation organs.

Until now, The leading propagation in the yam is to plant sliced tubers. Because tuber propagation is still advantageous to maintain stable production of yam. For that reason, in this study, the field trials were conducted to establish the stable and large-scale production system of tuber propagules of *Dioscorea batatas* Decne. by planting bulbils. In addition, weed infestation in the field is the problematic obstacle to cultivate the yam. Accordingly, various agronomic practices to control weeds in the field were carried out to establish labor-saving practices by mulching stuffs and chemical agents

Finally, after harvesting in 2010, the growth and yield were investigated by tuber length, size and weight in order to evaluate the possibility to use tubers in the following year.

**Materials and Methods**

○ Materials

- Bulbils collected in 2009 were stored dry at 4°C until planting
- Mulching materials : Black polyethylene film, Rice hull, non-woven fabric
- Chemical agent : Pendimethalin, Simazine, Alachlor, S-metolarchlor, Metabenzthiazuron

○ Methods

- For the 2010 experiments, all of the experimental plots were placed by randomized block design(RBD) in triplicate
- Mulching three other experimental plots by black polyethylene film, rice hull and non-woven fabric in *Dioscorea batatas* Decne. and leaving one plot unmulched to compare yield among plots.
- Applying five chemical agents to control weeds in *Dioscorea batatas* Decne.
- Cultivation of *Dioscorea batatas* Decne. by planting bulbils at a spacing of 50cm within rows and 20cm between rows.
- Harvested in 2010 and Compared the degrees of labor-saving among experimental plots
- Results were analysed on the basis of design and the differences between treatment means were compared by analyses of variances(ANOVA) followed by at 5% level DMRT.

---

주저자 연락처 Corresponding author : Su Hwan Lee E-mail : [suhnlee@korea.kr](mailto:suhnlee@korea.kr) Tel : 043-871-5579

## Results

- Effect of each pre-emergence herbicide against annual weeds was evaluated by weed control value and yield in the yam. It was suggested that Simazine(Dc,Triazine group) got best weed control value(85%) in the five chemical agents. Therefore, Simazine was selected for appropriate chemical agent.
- In mulched plots, yield per 10a in non-woven fabric plot was better than in the other three plots.
- From a economic point of view, It was analyzed that labor input and running expense were the highest in conventional practice due to labor cost and working hours of hand weeding whereas using labor-saving practices to control weeds were more cost-effective. Among labor-saving practices, It was suggested that production index for non-woven fabric was 26% up ,which were slightly higher than chemical agent and black polyethylene film.

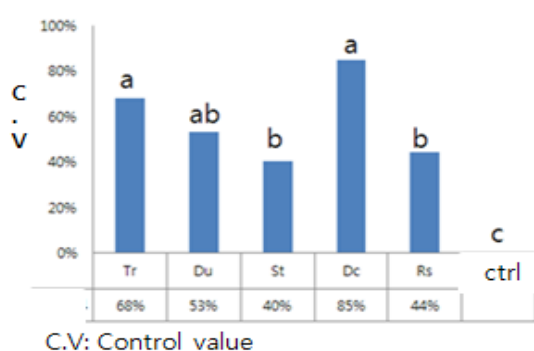


Fig 1. Weed control values by chemical agents DMRT 5% level  
Tr:Metribuzin, Du: S-metolarchlor, St:Pendimethalin  
Dc:Simazine, Rs:Alachlor

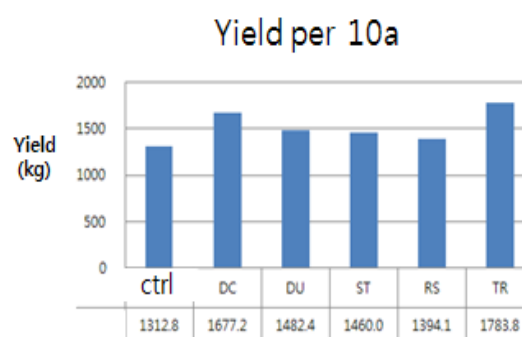


Fig 2. Yield per 10a in the yam(*Dioscorea batatas* Decne.)by chemical agents(Not significant at DMRT 5%)

Table 1. Growth and yield per 10a by mulching materials in the yam(*Dioscorea batatas* Decne.)

	tuber length (cm)	tuber diameter(mm)	tuber size(g)	No. of tuber /plant	tuber yield (kg/10a)
Control	20.9±3.19	45.2±1.87	118.6±10.50	1.5±0.35	1568.3
BPM	25.8±0.38	62.5±7.92	126.9±12.50	1.9±0.61	1654.2
RH	23.4±2.05	49.8±5.18	132.3±5.02	2.5±0.12	1678.0
NWF	23.6±3.04	55.5±10.00	125.1±14.67	2.1±0.83	1749.4

Control: Non- mulched plot, BPM : Black polyethylene mulching, RH:Ric-Hull, NWF : Non-Woven Fabric.

Table 2. Analysis of economic estimation in three labor-saving practices in the yam.

	Working hours (hrs/yr)	Labor index (%/10a)	Tuber yield (kg/10a)	Operating cost (¥1,000)	Gross profit (¥1,000)	Earnings (¥1,000)	production index
H.W	69.0	0	1568.3	379	1568	1,189	100
C.A	21.0	70.0%	1677.2	210	1677	1,467	123
N.W.F	21.8	68.0%	1749.4	240	1749	1,509	126
B.P.M	21.8	68.0%	1678.0	180	1678	1,498	124

H.W: Hand Weeding, C.A :Chemical agent, N.W.F:Non-Woven Fabric, B.P.M:Black Polyethylene mulching