In Vitro Bulblet Induction from Shoot Apices of *Lilium japonicum*

K. Maesato¹, K.S. Sarma², H. Fukui³, and T. Hara⁴

Faculty of Agriculture, Gifu University, Gifu 501-1.1, Japan

Additional index words. bulblet regeneration, micropropagation

Lilium japonicum Thunb., pink lily or lovely lily, is mainly grown in central Japan for use in religious ceremonies and as an ornamental. The wild population of *L. japonicum* is decreasing, and we are trying to revive its cultivation using plant tissue culture techniques. Only a report by Shoyama et al. (1988) details work on *L. japonicum*. Although lilies usually are propagated by scaling, a technique that produces bulblets from each bulb scale, depending on the cultivar, other organs of lily plants have regenerative capacity, e.g., leaves (Niimi and Onazawa, 1979), peduncles and petals (Takayama and Misawa, 1979); and bulblets (Shoyama et al., 1988). Shoot apices have been used as explants for bulblet regeneration (Sheridan, 1968); however, the bulblets regenerated from callus may have undergone

chromosomal changes (Bayliss, 1980). We report direct bulblet initiation from shoot apex explants. Since shoot apices are not affected by viruses, the resultant bulblets likely would be healthy.

Shoot apices were excised from in vitro grown bulblets and individually aseptically planted on Murashige and Skoog (1962) medium supplemented with 3% sucrose, 2,4-dichlorophenoxy acetic acid (2,4-D) and naphthaleneacetic acid (NAA) (Table 1). The pH of the medium was adjusted to 5.8 before autoclaving and gelled with 0.7% Difco Bacto agar. The cultures were maintained at 20C. After 55 to 60 days, the cultures were scored for regeneration, and results were subjected to statistical variance analysis.

The maximum frequency of bulblets was observed in medium containing no hormones (Table 1). With increasing hormone concentrations the frequency of bulblet formation gradually decreased with a concomitant increase in abnormal bulblets. Addition of hormone(s) is unnecessary to induce bulblets at high frequency. The lowest concentrations of 2,4-D and the two lower ones of NAA favored rooted bulblets, while the highest concentration of NAA, but not of 2,4-D, induced bulblets with roots and leaves just like the control (Table 1). The latter type of bulblets established themselves much faster in soil than those without leaves. These results clearly show that not only bulb scales but

Table 1. Effect of 2,4-D and NAA on bulblet induction from shoot apex explants of *L. japonicum*.

Treatment (μ M)	Bulblets produced (%)			
	Normal			
	Total	Roots	leaves	Abnormal
Control	67	43	57	20
2,4-D 2.26	53	67	33	47
5.52	33	40	60	60
9.05	0	0	0	100
LSD*	26			25
Control	67	43	57	20
NAA 2.68	53	100	0	33
5.36	33	100	0	60
10.72	13	40	60	60
LSD*	27			28

*F test showed that there was a significant difference between treatment plots, and the least significant difference (LSD) was calculated.

also shoot apices can be used as explants for micropropagating *L. japonicum*.

Literature Cited

- Bayliss, M.W. 1980. Chromosomal variation in plant tissue culture in culture. Intl. Rev. Cytol. (Suppl.) 11A:113-144.
- Murashige, T. and F. Skoog. 1962. A revised medium for rapid growth and bioassays with tobacco tissue cultures. Physiol. Plant. 15:473-497.
- Niimi, Y. and T. Onazawa. 1979. *In vitro* bulblet formation from leaf segments of lilies, especially *Lilium rebellum* Baker. Scientia Hort. 11:379-389.
- Sheridan, W.F. 1968. Tissue culture of the monocot *Lilium*. Planta 82:189-192.
- Shoyama, Y., N. Hasegawa, and L. Nishioka. 1988. *In vitro* propagation of *Lilium japonicum* by culture of bulblets. Shoyakugaku. Zasshi 41:352-355.
- Takayama, S. and M. Misawa. 1979. Differentiation in *Lilium* bulb scales grown *in vitro*. Effect of various cultural conditions. Physiol. Plant. 46:184-190.

Received for publication 7 Dec. 1989. The cost of publishing this paper was defrayed in part by the payment of page charges. Under postal regulations, this paper therefore must be hereby marked advertisement solely to indicate this fact.

¹K. Maesato: Murakashi Lime Industry Co., 1-10 Miyashitacho, Aso-gun, Tochigi 327-05, Japan.

²K.S. Sarma: Biotechnology Dept., School of Biological Sciences, Madurai Kamaraj Univ., Madurai 625021, India.

³Horticulture Laboratory.

⁴Biotechnology Laboratory.