have been suggested to be controlling factors for RRP of other plants.

Scion cultivars greatly influenced the RRP of manetti rootstocks (Table 1). 'Cara Mia' gave the highest no. of roots regenerated, whereas 'Golden Wave' regenerated the least. Also root regeneration of 'Golden Wave' (53.5%) was significantly lower than the other cultivars which regenerated higher than 85%. Similar results were reported in reciprocally grafted pin oak and scarlet oak (6). These results indicate the importance of the shoot system for root regeneration and therefore a possible reciprocal influence of the roots on the development of the top of the plant. Each scion cultivar may be different in photosynthetic or growth regulator activity. Variation in translocation rate of the root regenerating substances from the shoot through graft unions with different vascular connections (2) into the root system may also be involved in the differential scion cultivar effect on RRP.

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Artificial Induction of Bulbils in *Lilium* Species[1]

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Additional index words. Lilium spp., 6-benzyladenosine

Abstract. **6-Benzyladenosine (6-BAR), 6-benzylamino-9-2-methylpurine (6-BMA) and 6 benzylamino-9-2-ethylpurine (6-BEA) applied to stems induced or promoted bulbil formation and development in *Lilium* species. The total number and weight of bulbils varied according to amount of cytokinin absorbed.**

Lilium species are generally propagated vegetatively by bulb scales, bulblets (produced from axils of bulb scales) or bulbils (produced from above-ground leaf axils). Species vary in their ability to produce bulblets and aerial bulbils. In many cases, bulbil formation is dependent on environmental conditions, especially light intensity and moisture. Bulbils are not produced normally in *L. longiflorum,* but are occasionally produced under low irradiance and moist conditions. Sawa (1) reported the formation of bulbils in *L. longiflorum* by treating the cut portion of stem with benzyladenine. This report deals with the effect of cytokinins on bulbil formation and development in *Lilium* species.

Five *Lilium* species were studied: *L. lancifolium* Thunb. cv. Ugono-Hikari, a bulbil-forming species; *L. longiflorum* Thunb. cvs. Hinomoto, Georgia, and Kibiru, a non-bulbil forming species; and one of each cultivar of *L. speciosum* Thunb., *L. platyphyllum* Makino and *L. hansonii* Leicht., all of non-bulbil forming species. Individual bulbs were grown in 15 – 18 cm clay pots kept at 10 – 20°C under green house with the usual cultural procedures. Five uniform plants from each cultivar were selected for cytokinin treatment. A solution of 6-BAR was "fed" to a plant node about 2/3 up the stem by capillary action using cotton thread as shown in Fig. 1. 6-BAR was first applied when buds were macroscopically visible at concentrations from 10 to 1,000 ppm, but the amount absorbed ranged from about 0.02 mg to 8.0 mg per plant.

6-BAR suppressed growth of 'Georgia' lilies, a non-bulbil forming species, at all concentrations tested. Leaves below flower buds increased in size and faded to pale green. The stems of 6-BAR-treated plants curled downward slightly. Days of flowering decreased.

6-BAR promoted bulbil formation

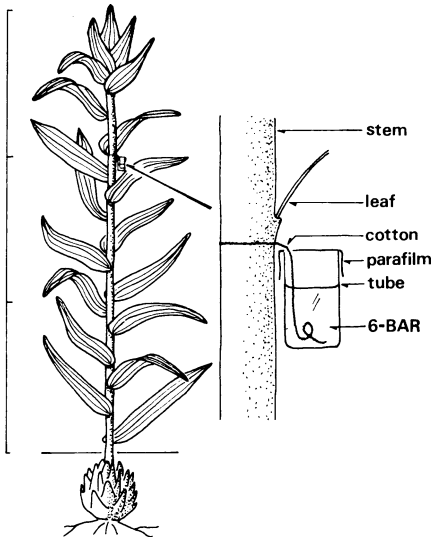

Fig. 1. Application method to apply 6-BAR solution into stem tissue of *Lilium*. The solution moves on the cotton thread by capillarity.

Table 1. The number and total weight of bulbils per individual formed by single and double application of 6-BAR in *Lilium longiflorum* cv. 'Hinomoto'.

6-BAR (mg)	No. of bulbils				Total wt of bulbils (g)
	Loose	Compact with leaves	Compact without leaves	Total	
0	0	0	0	0	0
2.0	24	6	20	50	16.0
4.0	45	3	37	85	51.1
6.0	43	6	36	85	30.5
2.0 + 6.0	83	82	66	231	23.3
4.0 + 4.0	82	61	82	225	21.8
6.0 + 2.0	30	42	113	185	27.2

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A B C

Fig. 2. Three types of bulbil in *L. longiflorum* cv. 'Hinomoto' formed in response to 6-BAR absorbed: A) Normal bulbils. B) Bulbils developed into branches. C) Bulbils with outer scale leaves developed into leaf-like organs.

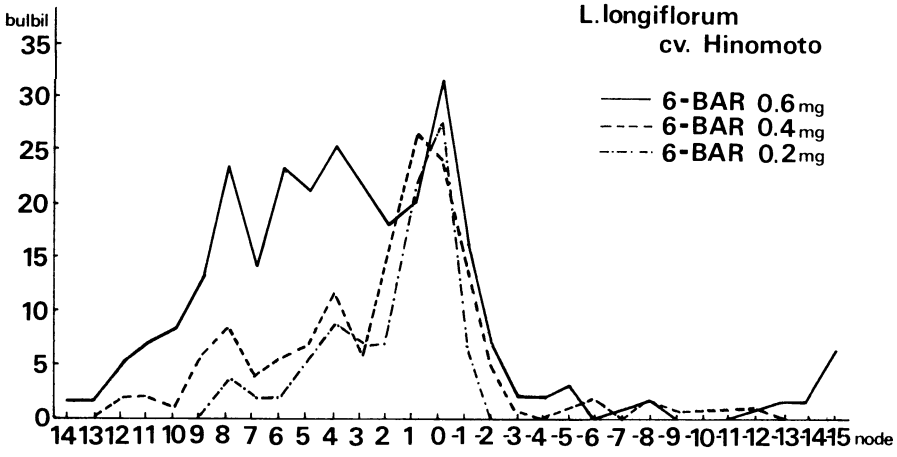

Fig. 3. The number of bulbils developed at nodes of *L. longiflorum* cv. 'Hinomoto' from varying 6-BAR absorbed. The node where 6-BAR is applied is labeled "0". Positive numbers are above the node of application, negative numbers are below.

of *L. lancifolium*, a bulbil-forming species. Bulbils either differentiated from protuberances found at the nodes or direct from the base of leaves. Bulbils were either normal or had leafy scales and some were branch-like (Fig. 2).

Buibil formation required 21 days from 6-BAR application in 'Hinomoto,' 'Georgia' and 30 – 35 days in *L. speciosum, L. platyphyllum,* and *L. hansonii.* Bulbil formation was usually first observed above the treated node, and later at lower ends. The distribution of bulbils at each node of 'Hinomoto' is shown in Fig. 3. Although no bulbils developed in a control, the number of bulbils increased as total amount of 6-BAR absorbed increased. Most bulbils developed at the nodes located above the site of 6–BAR application. In 'Hinomoto,' 'Georgia' and *L. hansonii* 1,000 ppm was optimum for bulbil formation but this concentration suppressed growth and eventually caused death in *L. speciosum* and *L. platyphyllum.* Ten ppm 6-BAR initiated bulbil formation in 'Georgia', and 'Hinomoto but had no effect in *L. speciosum, L. platyphyllum* and *L. hansonii.*

Two applications of 6-BAR promoted more bulbil formation at all nodes than a single application. However, in the 2 applications, the total weight of bulbils was less although the numbers of bulbils were larger than from the single application (Table 1).

Applications of 6-BMA and 6-BEA on *Lilium* species produced the same phenomena as 6-BAR.

We conclude that bulbil formation can be induced by cytokinin in *Lilium* spp. but the response is dependent upon genotype.

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Drought Resistance of Kentucky Bluegrass Cultivars[1]

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Additional index words. Poa pratensis

Abstract. **In a field test of 25 Kentucky bluegrass cultivars (*Poa pratensis* L.) "common types" were generally more drought tolerant than recently introduced turf types. 'Code 95', a common type, and 'Merion' exhibited high drought resistance and produced turf of good color, texture, and density. Turf mowed at 3.8 cm was more resistant to drought than turf maintained at 1.9 cm.**

Kentucky bluegrass is the most widely used turfgrass in the Northern U.S. Great quantities of water are being allocated to the maintenance of Kentucky bluegrass in the arid west (1, 3). With water resources remaining relatively constant and demands increasing rapidly, it is realistic to assume that water allocated to turfgrass maintenance will be drastically reduced in the near future. The primary objective of this study was to determine the

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