

## Effects of Plant Growth Regulators on Lateral Branching and Shoot Growth of *Hypericum*

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**Nature of Work:** Commercial production and management of ornamental groundcovers is especially difficult due to the cyclic nature of market demand. During peak periods, production cannot keep pace with demand due to many species possessing strong apical dominance resulting in few cuttings per stock plant (3). Secondly, vining plants held during the slack market periods become entwined and require numerous man-hours to harvest, usually with damage to the plant (personal communication - Georgia based growers). Greater management efficiency and consumer appeal may be possible if better control over branch induction and growth could be obtained (2, 5). Recent work has shown the potential of plant growth regulators (PGR's) in the management of groundcovers and woody ornamentals production (1, 4, 5, 7).

In our initial study, we identified three PGR's with potential for improving groundcover production management (6). The objective of the current study was to establish the effects of each PGR within expanded concentration ranges suggested by the first study. We expanded the study to include dormant and active growth application periods. The data presented here focuses upon the lateral branch production and height of *Hypericum calycinum*.

Rooted cuttings of *Hypericum* were selected for uniformity in the fall and allowed to become naturally dormant. Treatments were initiated on 24 Jan, 1992. Two hypericum plants/pot were used as the treatment unit. Treatments involved spraying foliage to the point of wetness with incremental rates of Atrimmec (dikegulac sodium), Royal Slo-Gro (maleic hydrazide), and Promalin (BA and GA4 + GA7). An untreated control group was included in the randomized complete block experimental design. There were five replications of two pots each within each treatment. Plant height and number of branches were recorded.

An identical experiment was initiated 14 April 1992 using actively growing hypericum cuttings selected as described above. All plants from both experiments were grown in polyethylene greenhouses and maintained using standard practices for groundcover production.

**Results and Discussion:** *Hypericum* treated with Atrimmec during active

growth exhibited a strongly linear growth reduction between 0 and 4800 ppm accompanied by a linear and quadratic trend toward increased number of lateral branches (Table 1). The greatest number of lateral branches per plant occurred at 3200 ppm, over 400% increase compared to control plants five months after treatment. Application of Atrimmec during dormancy did not give control of shoot growth but increased the number of new branches by over 200% at the 4000 ppm concentration. Baseline branch induction was increased naturally in the dormant plants by shoot terminal dieback due to winter freezing. The apparent differences in response of dormant and actively-growing hypericum plants to Atrimmec may allow the grower flexibility to increase branch number with or without affecting shoot length when desired. Induction of branching on newly transplanted cuttings is especially worthy of further work in relation to container plant establishment.

Spring application of Royal Slo-Gro to actively-growing hypericum resulted in 52% reduction of shoot length at 1800 ppm, but no additional reduction with higher concentrations (Table 2). The number of lateral branches showed a 225% increase at 2700 ppm, but a reduction at concentration beyond that. Dormant plants treated with Royal Slo-Gro exhibited a marked reduction of shoot growth, up to 59% at 3600 ppm. The number of lateral branches was reduced as the concentration increased beyond 1800 ppm, resulting in a 65% reduction at 5400 ppm.

Promalin applied to actively growing Hypericum caused a 26% increase in shoot length at 1000 ppm (Table 3). Lateral branches were increased 200% at the 1000 ppm concentration. Neither height nor number of branches were affected by application of Promalin to dormant hypericum. It appears that Promalin may be useful in situations when shoot growth needs to be increased, rather than controlled.

In conclusion, Atrimmec and Promalin may be potential tools in management programs where control of shoot growth and an increase in the number of lateral branches produced for cutting are desired. Increased lateral branch production may improve plant appearance and coverage in the landscape setting, as well as customer appeal in containers.

### **Literature Cited**

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**"SNA RESEARCH CONFERENCE - VOL. 37-1992"**

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Table 1. Effects of Atrimmec Application on Plant Height and Branching of *Hypericum*.

| Atrimmec (ppm) | Spring Application <sup>y</sup> |              | Dormant Application <sup>z</sup> |              |
|----------------|---------------------------------|--------------|----------------------------------|--------------|
|                | Plant Height (cm)               | No. Branches | Plant Height (cm)                | No. Branches |
| 0              | 22.9                            | 1.8          | 19.0                             | 5.0          |
| 800            | 24.1                            | 2.6          | 20.0                             | 6.6          |
| 1600           | 14.9                            | 6.1          | 18.9                             | 8.8          |
| 2400           | 13.8                            | 6.3          | 19.3                             | 9.3          |
| 3200           | 11.6                            | 7.6          | 17.4                             | 9.3          |
| 4000           | 8.5                             | 6.1          | 16.9                             | 10.1         |
| 4800           | 9.5                             | 6.1          | 16.0                             | 9.5          |

<sup>z</sup>Dormant treatment applied Jan. 24, 1992.

<sup>y</sup>Spring treatment applied to actively growing plants April 14, 1992.

\*, \*\*, \*\*\*, NNSignificant at P≤0.10, 0.05, 0.01, or nonsignificant respectively.

Table 2. Effects of Royal Slo-Gro Application on Plant Height and Branching of Hypericum

| Royal Slo-gro | Spring Application <sup>y</sup> |              | Dormant Application <sup>z</sup> |              |
|---------------|---------------------------------|--------------|----------------------------------|--------------|
|               | Plant Height<br>(cm)            | No. Branches | Plant Height<br>(cm)             | No. Branches |
| 0             | 21.8                            | 2.0          | 20.1                             | 6.3          |
| 900           | 21.2                            | 1.9          | 20.0                             | 5.3          |
| 1800          | 9.6                             | 4.2          | 14.5                             | 6.4          |
| 2700          | 9.9                             | 4.5          | 9.4                              | 3.6          |
| 3600          | 9.3                             | 2.5          | 8.2                              | 2.8          |
| 4200          | 8.9                             | 2.4          | 9.0                              | 2.3          |
| 5400          | 9.3                             | 2.5          | 8.7                              | 2.2          |
| Linear        | ***                             | ***          | ***                              | *            |
| Quadratic     | ***                             | ***          | ***                              | NS           |

<sup>z</sup>Dormant treatment applied Jan. 24, 1992.

<sup>y</sup>Spring treatment applied to actively growing plants April 14, 1992.

\*, \*\*, \*\*\*, NS Significant at PC ≤ 10, 0.05, 0.01 or nonsignificant respectively.

Table 3. Effects of Promalin Application on Plant Height and Branching of Hypericum.

| Promalin  | Spring Application <sup>y</sup> |              | Dormant Application <sup>z</sup> |              |
|-----------|---------------------------------|--------------|----------------------------------|--------------|
|           | Plant Height                    | No. Branches | Plant Height                     | No. Branches |
|           | (cm)                            |              | (cm)                             |              |
| 0         | 23.5                            | 2.0          | 19.4                             | 5.2          |
| 250       | 26.7                            | 2.4          | 21.1                             | 5.5          |
| 500       | 27.7                            | 2.9          | 22.8                             | 7.9          |
| 750       | 30.4                            | 3.5          | 20.5                             | 6.9          |
| 1000      | 31.7                            | 4.3          | 23.6                             | 7.5          |
| 1250      | 30.1                            | 3.8          | 21.5                             | 9.4          |
| 1500      | 29.1                            | 3.4          | 22.6                             | 9.2          |
| Linear    | ***                             | ***          | NS                               | NS           |
| Quadratic | ***                             | NS           | NS                               | NS           |

<sup>z</sup>Dormant treatment applied Jan. 24, 1992.

<sup>y</sup>Spring treatment applied to actively growing plants April 14, 1992.

\*, \*\*, \*\*\*, NS Significant at P ≤ 0. 10, 0. 05, 0. 01 or nonsignificant respectively .