Gibberellin influences the rest period or dormancy of seeds (4), shoots (1), and other plant parts (2, 5, 9). In potato, *Solanum tuberosum*, a condition of physiological rest prevails from the time of tuber initiation until 6 to 12 weeks after harvest depending on varietal characteristics (3). The rest period has been markedly curtailed by immersing freshly harvested potato tubers in gibberellin (9, 10). This effect, coupled with the rapid stimulation of growth of various plants by gibberellin (6), suggested that pre-harvest foliar sprays of this chemical might shorten the rest period of the immature, developing tubers. Results of the experiments described herein indicate that gibberellin initiates the sprouting process of the tubers on the plant when sprouting is least likely; they suggest further (7, 12) that gibberellin moves systemically in plants.

In a preliminary study (5) gibberellin applied as a foliar spray induced earlier sprouting of the subsequently harvested tubers. In a more detailed experiment, a spring crop of White Rose potatoes was grown in a split plot design with three replications of 20 plants per plot. The plants were sprayed to run-off four weeks, or one week before harvest with solutions containing 0, 10, 50, 100, and 500 mg/l of gibberellin. At harvest, 111 days after planting, examination of all the resulting tubers revealed that gibberellin applied to the foliage as late as two weeks before harvest markedly stimulated sprouting (table I). This effect was most pronounced with the earlier applications and the higher concentrations. In contrast, tubers from the untreated plants showed little or no sprouting activity at harvest. Of the tubers from plants which received sprays containing more than 10 mg/l of gibberellin four and two weeks before harvest, some produced secondary tubers sessile to the main tubers or terminally on elongated sprouts (fig 1), others produced barely visible to prominent sprouts without secondary tubers, and the remaining tubers showed no sprouting activity.

Pre-harvest chemical sprays have inhibited sprouting (13), but the induction of sprouting in developing tubers by foliar-applied chemicals is unusual. That gibberellin is effective may be especially significant, since gibberellin-like substances occur in higher plants (8) and since gibberellin may be related to several important physiological processes (11).

The acceleration of sprouting by foliar sprays in this experiment was comparable to that obtained by immersing whole or cut tubers in gibberellin after harvest (9). The appearance of sprouts and secondary growth shortly after foliar-spray applications (table I) implies that gibberellin is translocated downward in potato plants.

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**Table I**

<table>
<thead>
<tr>
<th>Gibberellin mg/l</th>
<th>Weeks Before Harvest</th>
<th>4 %</th>
<th>2 %</th>
<th>1 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.0</td>
<td>1.4</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>3.0</td>
<td>1.5</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>88.3</td>
<td>18.0</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>75.6</td>
<td>34.3</td>
<td>2.1</td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>83.6</td>
<td>50.0</td>
<td>5.8</td>
<td></td>
</tr>
</tbody>
</table>

L.S.D. for time of application = 6.5 N.S.
L.S.D. for concentrations = 10.7 10.2
L.S.D. for interaction = N.S. N.S.

* For statistical analysis original percentages were transformed to angles by using the formula:

\[
\text{Angle} = \arcsin \sqrt{\text{percentage}}
\]

** Average of three replications.

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3 The potassium salt of gibberellic acid was supplied by Merck & Co., Inc., Rahway, New Jersey.
SUMMARY

Foliar applications of gibberellin four weeks, two weeks, or one week before harvest resulted in visible sprouting on developing potato tubers. This suggested the rapid translocation of gibberellin in potato plants.

LITERATURE CITED


EFFECTS OF CHLORIDE AND SULFATE IONS ON THE GROWTH, LEAF BURN, COMPOSITION AND ANATOMICAL STRUCTURE OF TOBACCO (NICOTIANA TABACUM L.) 1,2

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The effects of chloride and sulfate ions on the growth, composition, quality and anatomical structure of plants are in need of clearer definition. Both anions are available in relative abundance to plants.

In addition to the growth and quality factors in most economic plants, the property of leaf burn in tobacco is very important. Satisfactory leaf burn, glowing capacity, or combustibility in cured tobacco must imply the ability to burn with a glow, thereby influencing aroma, flavor and character of the ash. Cellular structure has a bearing on texture, elasticity and other physical characteristics of the leaf which determine the general quality. Composition of the leaf influences the burn. It appears, therefore, that the leaf anatomy might also be related to the burn. Data presented elaborate on these varied effects.

Plant responses to Cl and SO4 levels of supply have been subject to considerable study. Chlorine has been shown by Broyer (4) to be an essential element for plant growth. Beneficial effects on yield and quality of tobacco from moderate applications of Cl were reported by Garner et al (6). Many workers (2, 6, 13, 18) have found retardation in leaf burn due to Cl. The amount of Cl absorbed by tobacco is substantial (18).

Sulfur, known to be an essential element, was shown to benefit plant growth at lower levels of supply by Eaton (5). He also described the effects of excess SO4 ion concentration and the wide variability in plant tolerances to these excesses. High applications of SO4 have lowered leaf burn of tobacco (18, 19) but relative uptake of SO4 was not as pronounced as Cl (14, 19).

The relation between anatomical structure and leaf burn of tobacco has not been defined. Behrens

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