EFFECT OF FOLIAR APPLICATION OF PHYTON-T, 
A SEAWEED EXTRACT ON GROWTH AND YIELD 
OF POTATO

Siddagangaiah¹, K.A. Raveesha² and T. Vasanth Kumar³

ABSTRACT: The effect of Phyton-T, a seaweed extract was studied on growth and yield of potato var. Kufri Jyoti for two years during kharif seasons of 2007 & 2008 at ARS, Madenur, Hassan. Growth parameters like number of stems, number of leaves, plant height, leaf length and breadth, leaf area and yield parameters; number and weight of marketable and non-marketable size tuber yield and percentage increase in yield over control were recorded. Foliar application of Phyton-T, three rounds on 25th, 35th and 45th day after planting at the concentrations of 0.5, 0.4 and 0.3% along with 0.3% mancozeb resulted in more vegetative growth - number of stems, number of leaves, plant height, leaf area and yield parameters - total tuber yield and increase in yield (39.21%). Higher yield (231.93 & 203.76 q/ha) was observed in Phyton-T treatments at 0.5% and 0.4% along with mancozeb 0.3%. To get better growth, biomass and yield, foliar spray of Phyton-T at 0.4% concentration along with mancozeb 0.3% in three rounds on 25th, 35th and 45th day after planting was found superior.

INTRODUCTION

Potato (Solanum tuberosum L.) has historically contributed for alleviation of poverty and hunger. Besides its significance to human food security, potato is also a crop with fascinating genetic traits and cultural history (9).

In Karnataka, potato occupies an area of 0.77 lakh hectares with annual production of 7.88 lakh tons and productivity of 10.25 tons per hectare (2) as against National average of 17.84 tons per hectare. It is a cause of concern that needs to be addressed on priority. Phytohormones, enzymes and trace elements have been used earlier to boost crop production.

The seaweed concentrate (SWC) is rich in enzymes, hydrolyzed protein complexes, cytokinins, auxins, gibberlins, ascorbic acid, folic acid, Fe, Mn, Cu, Zn and mannitol. Cytokinins, a class of phytohormones, function as antioxidants and have shown to improve drought resistance (8) on seedling establishment, rooting, flowering, fruit production and yield (5). The effect of SWC on plant growth, however, often depends on the concentrations used and the mode of application. This study was envisaged to know the efficiency of Phyton-T, a product from seaweed Sargassum wightii, on foliage and tuber productivity.

MATERIALS AND METHODS

The experiment was undertaken at Agricultural Research Station, Madenur, Hassan, Karnataka, for two years during kharif seasons of 2007 and 2008 as rainfed crop. The Phyton-T, a seaweed extract obtained from M/s. Greenlife Science Technologies Ltd., Mysore was used along with mancozeb, a contact fungicide in following four treatment combinations.

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RESULTS AND DISCUSSION

Before imposition of treatments there were no significant differences in number of shoots, number of leaves and plant height in different treatment plots.

After imposition of treatments in three rounds, the growth parameters recorded at 75 days after planting, showed significant increase (Table 1) in number of stems, number of leaves, plant height, leaf length and breadth, and leaf area of 4th leaf. The 4th compound leaf from the top is normally considered as an indicator leaf for nutrients and vigour. The leaf length, leaf breadth and leaf area of 4th leaf from the top at 75th day after planting was significantly more in the plants sprayed with 0.4% and 0.5% Phyton-T along with 0.3% mancozeb. Increased plant growth with the usage of seaweed concentrate on different crops have earlier been reported by many workers (1, 3, 4, 5, 7) but the effect of Phyton-T on the growth parameters of potato had not been reported.

 Marketable size, and total tuber number and tuber yield per plant were significantly higher (Table 1 and 2) in all the treatments sprayed with different concentrations of phyton-T along with mancozeb 0.3%. This may be attributed to good vegetative growth that resulted due to spraying with Phyton-T at different stages of potato plant growth. Similarly, total tuber yield per hectare was significantly higher (231.9 q) in plots sprayed with 0.5% phyton-T than that of with over 0.3% phyton-T (192.2 q) and untreated control (166.4 q). This can be attributed to higher photosynthetic activity due to increased leaf size. Seaweed extract (SWE) are known to impart anti-senescence activity due to the presence of minerals especially Fe (6, 10). Further, cytokinins present in SWE at higher levels, have probably imparted drought
resistance and thereby increased the rate of bulking in potato (12).

Higher dry weight of haulms, dry matter percentage of tubers and dry weight of tubers per plant in the treatments with three foliar sprays of Phyton-T at the concentrations of 0.5 and 0.4% may be ascribed to the higher amount of shoot and tuber production (Table 2). Similar results have been reported by Wang Qiang et al. (11) in cucumber.

**LITERATURE CITED**


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**Table 1. Effect of phyton-T on growth and yield parameters status at 75th day after planting and at harvest (Pooled over two years).**

<table>
<thead>
<tr>
<th>Treatment details</th>
<th>Stem no. / plant</th>
<th>Leaf no. / plant</th>
<th>Plant height (cm.)</th>
<th>Leaf length (cm.)</th>
<th>Leaf breadth (cm.)</th>
<th>Leaf area (sq. cms.)</th>
<th>Tuber number/plant</th>
<th>Marketable</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1= Control – mancozeb (0.3%)</td>
<td>2.12</td>
<td>32.8</td>
<td>47.8</td>
<td>15.4</td>
<td>11.3</td>
<td>218.6</td>
<td>2.1</td>
<td>2.9</td>
<td></td>
</tr>
<tr>
<td>T2= Phyton –T (0.3%) + mancozeb (0.3%)</td>
<td>2.22</td>
<td>37.7</td>
<td>51.2</td>
<td>16.1</td>
<td>11.6</td>
<td>235.5</td>
<td>2.7</td>
<td>3.2</td>
<td></td>
</tr>
<tr>
<td>T3= Phyton –T (0.4%) + mancozeb (0.3%)</td>
<td>2.35</td>
<td>39.1</td>
<td>53.0</td>
<td>16.4</td>
<td>11.9</td>
<td>246.0</td>
<td>2.9</td>
<td>3.6</td>
<td></td>
</tr>
<tr>
<td>T4= Phyton –T (0.5%) + mancozeb (0.3%)</td>
<td>2.40</td>
<td>40.1</td>
<td>53.7</td>
<td>16.8</td>
<td>12.1</td>
<td>256.9</td>
<td>3.1</td>
<td>3.9</td>
<td></td>
</tr>
</tbody>
</table>

**Table 2. Effect of phyton-T on tuber yield, percentage increase in yield, tuber dry matter content, dry weight of haulms and tubers/plant (Pooled over two years).**

<table>
<thead>
<tr>
<th>Treatment details</th>
<th>Tuber yield /plant</th>
<th>Tuber yield (q/ha)</th>
<th>Percentage increase</th>
<th>Tuber dry matter (%)</th>
<th>Dry weight of haulms (g)</th>
<th>Dry weight of tuber (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Marketable</td>
<td>Total</td>
<td>in yield (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1= Control – mancozeb (0.3%)</td>
<td>202.0</td>
<td>221.9</td>
<td>166.4</td>
<td>-</td>
<td>16.78</td>
<td>15.76</td>
</tr>
<tr>
<td>T2= Phyton –T (0.3%) + mancozeb (0.3%)</td>
<td>240.9</td>
<td>256.2</td>
<td>192.2</td>
<td>15.5</td>
<td>17.61</td>
<td>19.29</td>
</tr>
<tr>
<td>T3= Phyton –T (0.4%) + mancozeb (0.3%)</td>
<td>257.9</td>
<td>271.7</td>
<td>203.8</td>
<td>22.3</td>
<td>17.95</td>
<td>21.15</td>
</tr>
<tr>
<td>T4= Phyton –T (0.5%) + mancozeb (0.3%)</td>
<td>298.3</td>
<td>309.2</td>
<td>231.9</td>
<td>39.2</td>
<td>19.29</td>
<td>21.39</td>
</tr>
<tr>
<td>SEM</td>
<td>13.07</td>
<td>12.11</td>
<td>9.32</td>
<td>0.32</td>
<td>0.45</td>
<td>3.72</td>
</tr>
<tr>
<td>CD (P≤0.05)</td>
<td>40.38</td>
<td>37.57</td>
<td>28.88</td>
<td>1.35</td>
<td>1.38</td>
<td>11.58</td>
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</tbody>
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