Introduction

- In 2019, an estimated 77.9 million pounds of burley tobacco was produced in Kentucky (USDA, 2020)
- The incidence rates of musculoskeletal disorders in support activities for crop production is 30.2 per 10,000 full-time workers (Bureau of Labor Statistics, 2019)
- The purpose of the study was to assess the ergonomic risk factors of cutting and spiking tobacco leaves during harvest

Methods

- Muscle activity and posture was assessed in the field during the cutting and spiking activities of tobacco harvesting

- Research Subjects
  - Nine (9) males
  - Mean Age (years): 30.7 (5.0)
  - Mean Body Mass Index (kg/m²): 26.8 (4.4)

- Data Collection Tools
  - Inertial Measurement Units: thoracic flexion
  - Electromyography: muscle activity of the mid deltoid and trapezius muscles

- Data Collection Tools
  - A maximum voluntary contraction (MVC) was collected for each participant to evaluate muscle activity as a percentage of MVC

Results

- In comparison to MVC’s, muscle activation of the mid deltoid and trapezius muscles do not indicate high force muscle exertions during tobacco cutting and spiking activities
- Awkward postures are the greatest ergonomic risk factor in tobacco harvesting activities

<table>
<thead>
<tr>
<th>Thoracic Flexion During Spiking Activities</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>10th percentile</td>
<td>-2.52</td>
<td>5.28</td>
</tr>
<tr>
<td>50th percentile</td>
<td>6.02</td>
<td>5.76</td>
</tr>
<tr>
<td>90th percentile</td>
<td>14.56</td>
<td>10.35</td>
</tr>
<tr>
<td>% Time in neutral posture</td>
<td>39.72</td>
<td>22.74</td>
</tr>
</tbody>
</table>

Discussion

- Results collected indicate that tobacco harvesting activities consist of high repetition, low force tasks that have the potential to result in chronic repetitive motion injuries
- Designing tools to assist in cutting and spiking activities that reduce awkward postures and repetitive movement can significantly reduce the prevalence of musculoskeletal disorders in tobacco harvesters

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