Effective Swath, Pattern Uniformity and Spray Droplet Spectra from Manned and Remotely Piloted Rotary Wing Aircraft

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Objective: Examine the similarities and differences in pattern uniformity, effective swath, application rate and droplet spectra between manned and remotely piloted rotary wing aircraft.

Study Setup
Application Heights: 2, 3, and 4 m
Ground Speeds: 1, 3, 5, 7 m/s

Robinson R-44 vs. HSE V6A+
- Single Rotor vs. Six Rotors
- (34) 80-08 Flat Fan Nozzles @18 psi vs. (6) 80-0067 Nozzles @72 psi
- 34' Boom 70 MPH vs. 6' Boom 3-15 MPH
- 80 gallon tank vs. 4 gallon tank
- Manned vs. Remotely Piloted

WSP Results

[Graph showing WSP Results]
Study Setup

<table>
<thead>
<tr>
<th>Height</th>
<th>% Boom</th>
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<tbody>
<tr>
<td>10'</td>
<td>76</td>
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<tr>
<td>10'</td>
<td>88</td>
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<tr>
<td>30'</td>
<td>100</td>
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<td>30'</td>
<td>76</td>
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<td>30'</td>
<td>88</td>
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<tr>
<td>30'</td>
<td>100</td>
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Conclusions

• Good spray patterns can be achieved with both manned and remotely piloted aerial application systems.
• The typical effective swath of a manned helicopter is approximately twice that of common remotely piloted multi-rotor systems.
• Both droplet spectra and application rate label requirements can be met by both systems.

Conclusions

• Manned helicopters are more productive than remotely piloted systems because of operating speeds, effective swath, and payload considerations.
• Remotely piloted systems may be a good replacement for backpack sprayers and for small areas such as organic farms and vineyards.
• More research of these application systems is necessary to ensure targeted delivery of pest control products while mitigating drift.