2014 Lubbock County
Management of Resistant Careless Weed in Roundup Ready Cotton Production Systems
(A part of North Region Cotton Premier Programs - Weed Pests)
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Relevance:
Lubbock County typically produces 260,000 acres of cotton with a gross income in excess of $100 million annually. Careless weed (pigweed) resistance to Roundup herbicide in Roundup-Ready Cotton Production Systems began in the mid-South. This was caused by over-reliance on a single mode of action in herbicide selection. This careless weed resistance to Roundup was documented in Terry and other counties surrounding Lubbock in 2012. By mid-season of 2013, our office began receiving reports of herbicide resistance in Lubbock County. This educational program addressed herbicide resistance management while maintaining cotton yields, and reduction of careless weed infestations before they become un manageable. This issue was identified as a priority issue by the Lubbock County Ag Committee in the fall of 2013 to be addressed In 2014 Extension programs. This program was targeted to Lubbock County cotton producers and landowners.

Response:
The goals of this educational effort were:
1. Conduct a baseline survey (Jan ’14) to determine extent of resistance problem and identify current common weed management practices in 2013 and prior.
2. Understanding of careless weed biology and reproductive potential.
3. Knowledge / Adoption of Best Management Practices recommended by AgriLife Extension to manage herbicide-resistant weeds.

Primary teaching points included: zero - tolerance of resistant careless weeds, multiple modes of action, preplant incorporated herbicides and proper incorporation (2-pass incorporation), pre-emergent herbicides behind the planter, post-emergent herbicides, post - directed lay-by, mechanical control and/ or spot-spraying to control escapes.

In response to this issue, the following educational efforts were conducted in Lubbock County in 2014:
• Hub of the Plains Ag Conference, Feb 12, 2014 (59 attending).
• Weed Resistance Management Newsletter, May 31, 2014 (97 recipients)
• Weed Management Newsletter, June 19, 2014 (97 recipients)
• Two In-Field Result Demonstrations
  * One- vs. Two-Pass Incorporation of Yellow Herbicides, April, 2014.
• In-season Educational Fact Sheets delivered to various agribusinesses.
• In-season Radio and Television reports (KJTV, Ch 22, FOX Ch 34, Ch 13, KRFE).
• Lubbock County Field Day, Aug 29, 2014 (19 participants) * This educational program was conducted at Acuff Co-Op Gin Office because 1.5 in rainfall prevented field trial location visits.
• Panel Discussion and Q&A Session at West Texas Ag Chemicals Institute Annual Conference, Sept, 2014 (120 participants - producers, industry representatives, and consultants).
• Lubbock Avalanche Journal Follow-up News Release (Sept, 2014).

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**Results:**
Producer knowledge and behavior change was measured utilizing a retrospective post evaluation following face to face programs, and an end-of-season Qualtrics on-line evaluation of a portion of participants.

Results of evaluation survey from Feb 12, 2014  Hub of the Plains Ag Conference (50 responses; 83% response rate).

<table>
<thead>
<tr>
<th>Your understanding of...... (Scale: 1=Poor, 5=Excellent)</th>
<th>Mean Before the conference</th>
<th>Mean After the conference</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Budgeting for Careless Weed Resistance</td>
<td>2.09</td>
<td>3.26</td>
<td>39 %</td>
</tr>
<tr>
<td>Management Strategies to control herbicide resistant weeds.</td>
<td>2.35</td>
<td>3.37</td>
<td>34.3</td>
</tr>
<tr>
<td>Factors involved in weed management systems and herbicide selection.</td>
<td>2.56</td>
<td>3.5</td>
<td>31.3</td>
</tr>
<tr>
<td>2013 cotton variety trial results and future herbicide management traits.</td>
<td>2.37</td>
<td>3.39</td>
<td>34</td>
</tr>
</tbody>
</table>

Intentions to adopt practices learned at the conference.

<table>
<thead>
<tr>
<th>Practice or Technology</th>
<th>Number who probably or definitely will adopt.</th>
<th>Number who could adopt (excludes N/A or already adopted).</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify and manage herbicide resistant weeds based on Best Mgt. Practices provided by AgriLife Extension.</td>
<td>26</td>
<td>31</td>
<td>83.9%</td>
</tr>
<tr>
<td>Utilizing grain sorghum as a tool for weed resistance management.</td>
<td>16</td>
<td>27</td>
<td>59.3</td>
</tr>
<tr>
<td>Utilizing yellow herbicides and other herbicides with different modes of action.</td>
<td>11</td>
<td>19</td>
<td>57.9</td>
</tr>
</tbody>
</table>

* Participants collectively managed 49,379 acres of cotton. A total of 83% of respondents anticipated economic benefits from participating in this conference that they estimated at $14.03 per acre on average.

Based on a separate evaluation survey from the Aug 29, 2014 Lubbock County Field Day (19 participants; 47% response rate), 9 respondents collectively managed 14,967 acres of cotton. 4 of the 19 participants were not producers. A total of 89% of respondents anticipated an economic benefit from this meeting in the range of: $ 6 to 15 (28.5%), $ 16 to 25 (43%), and >$ 25 (28.5%).

The year-end Qualtrics on-line evaluation was completed by 4 of 38 (11% response rate) Lubbock County program participants. Only 3 were producers who collectively planted 2,424 acres of cotton in 2014. Two stated that they would definitely manage weeds based on Extension recommendations, and 1 had already adopted the recommendations. All 3 producers estimated economic gains of $6 to $15 per acre as a result of program participation.

These educational efforts reached a total of 198 group meeting participants, 5 office contacts, 155 site contacts, 65 telephone contacts, 195 newsletter contacts, and an estimated media audience of 415,700.

**Economic Impact:**
The Lubbock County participants who responded to program evaluations estimated economic returns
totaling $726,796 to their operations. Similar responses from participants in the Panhandle and South Plains (North Region) estimated economic returns of more than $9.9 million from the Cotton Premier-Weed Pests educational efforts conducted by Texas A&M AgriLife Extension.

**Future Plans:**
These educational program results will be interpreted to the Lubbock County Commissioners Court, the Lubbock County Ag Committee, and other key stakeholders and decision makers. Educational efforts will continue regarding control of resistant weed populations with current and forthcoming technologies.

**Acknowledgements:**
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