Restoring underutilized Native American food crops
Navajo Spinach, Cleome serrulata & Native Peach

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Spinach Introduction
• Cleome serrulata has been used as fresh greens and natural dye by the Navajo & Pueblo Tribes.
• Consistent supply could be of benefit as a local source of food and dye.
• This may require managed plantings.
• Germination requirements unknown.

Materials & Methods
Seed collected from 7 locations in NM, AZ, & UT

2018 Germination Treatments
• 4 weeks chilling at 4, 7, or 10°C ±
• ± Promalin® (GA4+7 & BA); ± Novagib® (GA4+7); ± MaxCel® (BA);
• ± Novagib® + MaxCel®; ± H2O2
• Seed soaked for 4 hours
• 25 seeds per rep; 5 replications
• Canyon De Chelly seed source.

Peach Introduction
First recorded sighting in Southwest by Spanish missionaries in 1619.
Found growing with Pueblo and Navajo Tribes
Seed propagated (Land Race)
Only 2% of original orchards remain

Fruit Characteristics
White free-stone (Most common)
Yellow Free-stone
Small
Uses
Boiled
Fresh
Sundried
Trade goods

Spinach Results
Soaking Trial 2017
• Treatments include GA3+H2O2, H2O2, and No Treatment
• GA3 increased % germination at all temperatures except 20°C
• As temperatures increases, % germination decreases
• Navajo Spinach does not germinate at 20°C
• Increasing chilling time does not improve germination
• Inconsistent T50 and T10/90 between 4 and 8 week trials

Gibberellin Trial 2017

TREATMENTS

<table>
<thead>
<tr>
<th>TREATMENTS</th>
<th>Temp</th>
<th>T10 (Days)</th>
<th>T50 (Days)</th>
<th>T10/90 (Days)</th>
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</thead>
<tbody>
<tr>
<td>GA3 500+H2O2</td>
<td>4°C</td>
<td>16</td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td>GA3 750+H2O2</td>
<td>4°C</td>
<td>16</td>
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<td>11</td>
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<tr>
<td>GA3 1000+H2O2</td>
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<td>16</td>
<td>14</td>
<td>11</td>
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<tr>
<td>H2O2</td>
<td>4°C</td>
<td>16</td>
<td>14</td>
<td>11</td>
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<tr>
<td>Control</td>
<td>4°C</td>
<td>23</td>
<td>18</td>
<td>17</td>
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</table>

GA3 Treatments

Hormone Treatments
• H2O2 does not break physiological dormancy
• Stratification at 7C more commonly achieves highest germination
• MaxCel® (BA) suppresses seed germination when chilled at 7& 10C

Discussion
Spinach "Seed Collection Location trial" is on-going to test current conclusions with temperature and hormone treatment effects on all seed sources.

Genome Mapping
• DNA analysis to compare Old World peach varieties to Southwest varieties

Seed sources
2 Hopi, AZ
2 Canyon Del Muerto, AZ
Multiple from Navajo Mountain, UT

Dendrochronology
• Compare ring widths with oral histories regarding irrigation management
• Determine life span
• Time period

Discussion
Final results for peach will be Fall 2018.

Acs 26 Nov 2013.
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