

Nebraska Soybean Board
FINAL Research Report Form



1/14/2019

Note: Submit this report no later than 90 days after the NSB-funded project officially terminates.

This post-project 90-day time-frame will allow the Lead PI time to complete any final data analysis and a final technical report, plus the drafting of any articles for submission to scientific journals. Note that this completed report will be provided to the curator of a national database of State, Region, and USA Soy checkoff funded projects.

Project # and Title: Soybean Row Spacing and Nitrogen Management On-Farm Research in Nebraska, 18R-27-1/1 #1730

Principal Investigator: Strahinja Stepanovic

Co-PI's & Institutions:

Project Date (Including Extension): 09/01/2017 **to** 09/01/2020 **(example: mm/dd/yyyy to mm/dd/yyyy)**

Total Budget for Project: \$ 10,716.00

1. Briefly State the Rational for the Research:

Due to lack of management options to control resistant insect pests (Western Corn Rootworm, Western Bean Cutworm) and bacterial disease outbreaks (Goss's wilt, Bacterial leaf streak) occurring in continuous corn systems, rotations including soybean is becoming increasingly important crop in western Nebraska. Although rotating corn with soybean would mitigate these issues, farmers in western Nebraska are hesitant to adopt soybeans in their irrigated rotations in fear of inconsistent yield and profit. More research is needed to identify underpinning causes for soybean yield limiting factors in semiarid western Nebraska.

2. Research Objectives (copy from project, but keep in a brief bullet format):

- To quantify two suspected soybean yield gaps (row spacing and late season nitrogen management) in variable soil types.
- To develop scientific-based resources for growing irrigated soybean in a semi-arid environment.
- To increase adoption of soybeans in Western Nebraska for a more sustainable agricultural production.

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3. General Approach Used and (if applicable) the Nebraska Test Locations:

Total of six on-farm research studies (four originally proposed) were conducted in southwest NE:

1. Impact of row spacing on soybean yield - three locations on 15 vs 30 inch rows (two at Chase Co and one at Perkins Co)
2. Impact of late season N on soybean yield and yield quality - three locations comparing w/ vs w/o 80 lbs of N/ac @ R3 soybean (Chase Co, Lincoln Co, Perkins Co).

Refer to Crop Watch article or On-farm research report for details on study approach and methodology used.

4. Describe: Deliverables & Significance Attained for Each Research Objective:

MAJOR RESEARCH FINDINGS (OBJECTIVE 1)

- 4 to 12 bu/ac yield increase when soybeans were planted in 15-inch as compared to 30-inch rows (three on-farm research studies).
- Late season (R3) N fertilization at ~80 lbs of N/ac did not increase yield or profit of soybeans grown in SW NE (three on-farm research studies).

IMPACT OF EDUCATIONAL ACTIVITIES (OBJECTIVE 2)

- 2018 Crop Production Roadshow was attended by 70 people, and 29 surveyed participants representing 301,600 ac (26,600 ac farmers and 275,000 ac consultants) reported 45% increase in knowledge about late season N management in soybeans.
- 2018 On-farm research Update at Grant was attended by 15 farmers representing 29,107 producer acres and 60,001 advisor/employee acres.
 - o Estimated value of knowledge gained was \$16.7/ac; in total \$487,542 for producers and \$1,005,017 (\$16.7/ac) for advisor/employee.
 - o 100% reported the event was one of the best of above average
 - o 71% likely to make changes on row spacing
 - o 87% learned new information about in-season N management
 - o Additional comments: "Excellent information", "Great program, enjoyable"
 - o What is one thing you learned today that you will use to make a change in your operation? "row widths affecting soybean yields", "15 vs 30 soybeans", "N management"

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4. Describe: Deliverables & Significance Attained for Each Research Objective (continued):

IMPACT ON NEBRASKA FARMS (OBJECTIVE 3)

ROW SPACING. The two farmers I worked with on row spacing study switched from wide to narrow rows, and I've seen more farmers doing this in the region.

LATE SEASON N. Three farmers that did nitrogen study had a bit different take on results. Conrad Nelson of Wallace, NE was the most surprised by the results as he's been putting on late season N for at least 10 years. Other two farmers also questioned the practice and will continue evaluating it in the near future. I've had many good discussions with farmers over the phone and during the field days. One of them was Max Kaiser, a farmer from Imperial area, who decided not to fertilize with N later in the season and ended up with very satisfactory 80+ bu soybean crop, generating more profit from eliminating unnecessary production inputs.

CHANGE IN PRACTISE. I was pleased to hear that SW NE soybean farmers are changing practices and growing more profitable crop. With farmers being more confident in the locally conducted research other farmers in the area will pick up and be more confident in growing soybeans.

CHANGES IN ACREAGE WAS MOSTLY RELATED TO MARKET. Based on FSA planted acreage in eight county area of southwest NE including Perkins, Chase, Dundy, Lincoln, Hays, Hitchcock, Frontier and Red Willow soybean acres increased soybean by 35% in 2017 and decreased by 2 % in 2018. Frequency of soybean in irrigated crop rotation has approximately once in five years.

CHANGE IS REAL, BUT IT IS SLOW. I cannot attribute increase of acreage directly to the project. However, pro-active grower education and more locally conducted research data will surely give soybean growers confidence to grow soybeans profitably and consider increasing frequency of soybean under irrigation.

FUTURE DIRECTIONS. Check publicized research report (Crop Watch) from 2018/19 that includes interactions between planting dates, seeding rates, row spacing and N management at two locations. With strong date plan is to be active in spreading the word.

5. List where the Project Research Results/Findings were Publicized:

Crop Watch articles (FIRST YEAR OF PROJECT – 2017/18):

- How Row Spacing Affects Irrigated Soybean in Southwest Nebraska:
<https://cropwatch.unl.edu/2018/how-row-spacing-affects-irrigated-soybean-southwest-nebraska>
- Is Late Season N Fertilization Warranted for Irrigated Soybean in Western Nebraska:
<https://cropwatch.unl.edu/2018/late-season-n-soybeans>

Individual reports on each study location also available in 2018 On-Farm Research Book and in On-Farm Research searchable database: <https://cropwatch.unl.edu/on-farm-research>

Crop Watch article (SECOND YEAR OF PROJECT – 2018/19):

- o Seeding Practices and Nitrogen Management for Western Nebraska Soybean: What Matters and Why:
<https://cropwatch.unl.edu/2018/soybean-seeding-N-mgmt-western-NE>

I have seen a number of popular farm journals publicizing research such as Nebraska Farmer. I expect more publicity on radio, UNL's market journal, NVT, etc.

Note: The above boxes will automatically accommodate for your text inputs; HOWEVER, the Final Report comprised of the above listed items must be kept to THREE PAGES. A Technical Report of no more than TEN PAGES (preferably fewer) can be appended to this report.

Submit both reports as a single PDF with this file name format: #XXX > FINAL > Project Title > PI last name

Please email this completed form to the Agriculture Research Division (jmonaghan2@unl.edu) based on the reporting schedule given to you. If you have any questions, please call the ARD at 2-2045 or Victor Bohuslavsky at the Nebraska Soybean Board Office at (402) 432-5720.