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| Please use this form to clearly and concisely report on project progress. The information included should reflect quantifiable results that can be used to evaluate and measure project success. Comments should be limited to the designated boxes. Technical reports, no longer than 4 pages, may be attached to this summary report. |
| Project Number: |  |
| Project Title:  | Development of functional ultra-high stearic acid soybean germplasm |
| Organization:  | University of Missouri |
| Principal Investigator Name: | Feng Lin, PhD |
| Other investigators: |  |
| Report Period: | June 15, 2024 |
| **Research updates**:Our ongoing efforts are focused on developing high-yielding lines with a constant focus on achieving a high stearic acid content. Table 1 provides an overview of the University of Missouri’s 2024 breeding pipeline for high stearic (HS). Table 1. 2024 Breeding Pipeline for HS.

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| **Test/Line/Population** | **Description** | **# of Entries** |
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| AYT | Advanced Yield Trial  | 1 |
| PYT | Preliminary Yield Trial | 3 |
| Progeny Rows | Oleic and Linolenic content and visual selection  | 107 |
| Population Development | F1 to F4 generation | 4 |
| New Crosses | Population Development | 3 |

**2024 AYT.** Only one advanced breeding line, namely S22-23421HS was planted at Lee Farm, Portageville, MO (2 local environments) laid out in 12-foot-long plot with two replications and at six locations across different states (AR, IL, MO). The stearic acid content of this line is 7.11%. **2024 PYT.** Three preliminary breeding lines were entered in the 2024 PYT. These lines were selected from the progeny row nursery based on their phenotypic appearance and stearic acid content. The stearic acid content of these lines ranged from 11.8 – 12.5%. **2024 Progeny Rows.** Approximately, 107 new breeding lines obtained from HS crosses will be planted in single progeny rows (Table 2). Currently, these seeds are being processed and will soon be planted at Lee Farm, Portageville, MO. The stearic acid content of these lines ranged from 8.2 – 21.9%.Table 2. Summary of 107 breeding lines in the 2024 Progeny Rows.

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| --- | --- | --- | --- |
| **Population** | **Pedigree** | **No. of Lines** | **Stearic Acid (%)** |
| CR22-092 | S19-19705/S16-13165 | 44 | 8.2 – 21.9 |
| CR22-094 | S19-19731/S18-6328 | 26 | 8.4 – 17.5 |
| CR22-095 | S19-19731/S19-14797 | 37 | 8.2 – 16.5 |

**2024 Population Development**. Four bi-parental populations for increasing stearic acid content were sent to the Costa Rica winter nursery for generation advancement from the F1 to the F4 generation and will be planted in our progeny rows in 2025 in Portageville, MO (Table 3).Table 3. List of four bi-parental populations in 2023.

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| **Cross** | **Pedigree** |
| S23-502 | S22-23407/S19-10701 |
| S23-503 | S22-23407/S19-14797 |
| S23-506 | S22-23373/S16-7922 |
| S23-507 | S22-23373/S16-11644 |

**2024 New Crosses.** We aim to develop three new bi-parental populations by crossing elite breeding lines with HS parents.   |