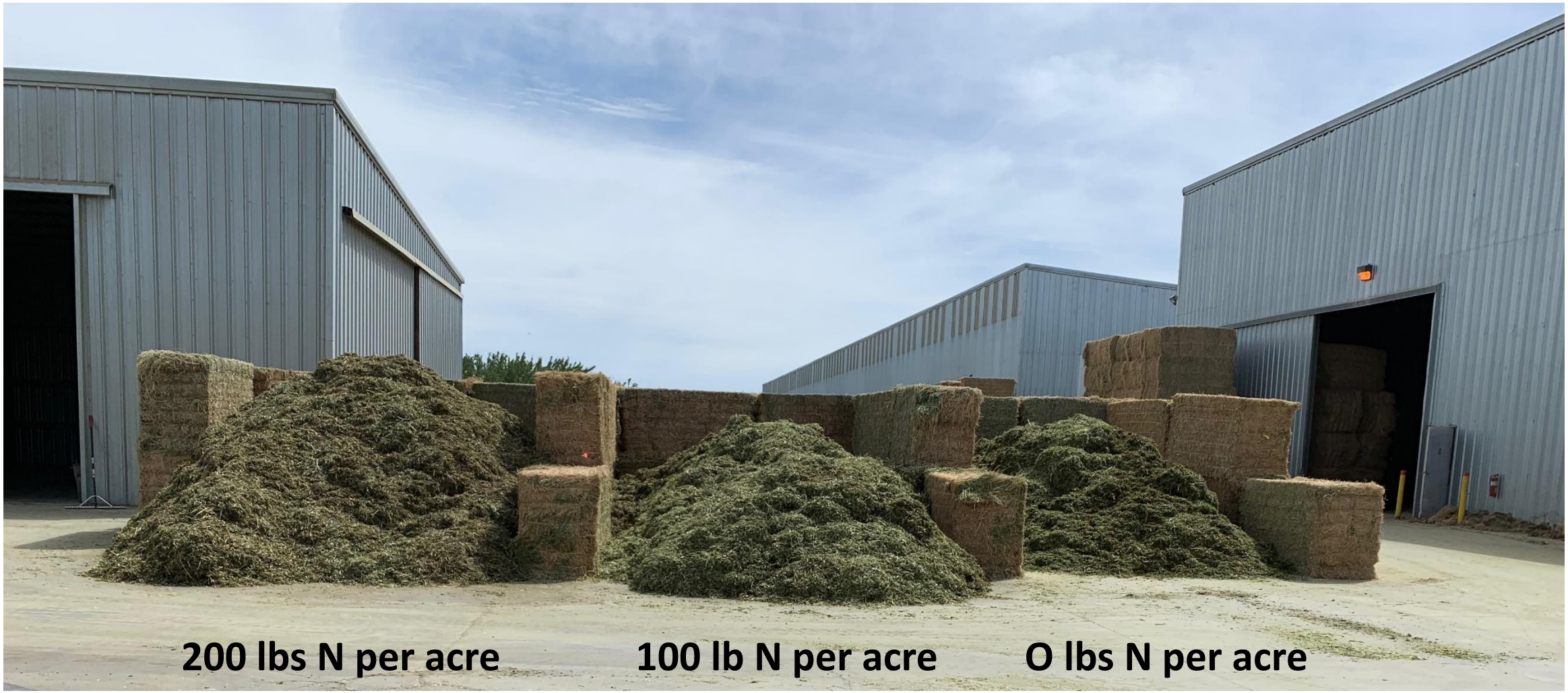
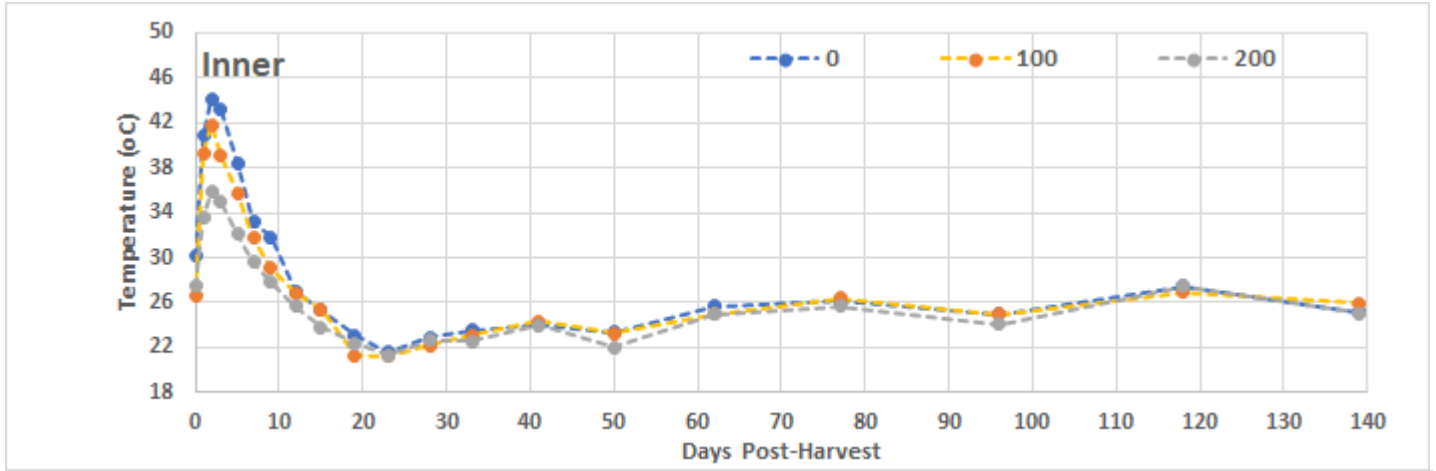
Forage chopping for transport to high moisture baling at Gombos Brothers in Woodland.
Staas Brothers Custom Harvesting. April 29, 2020

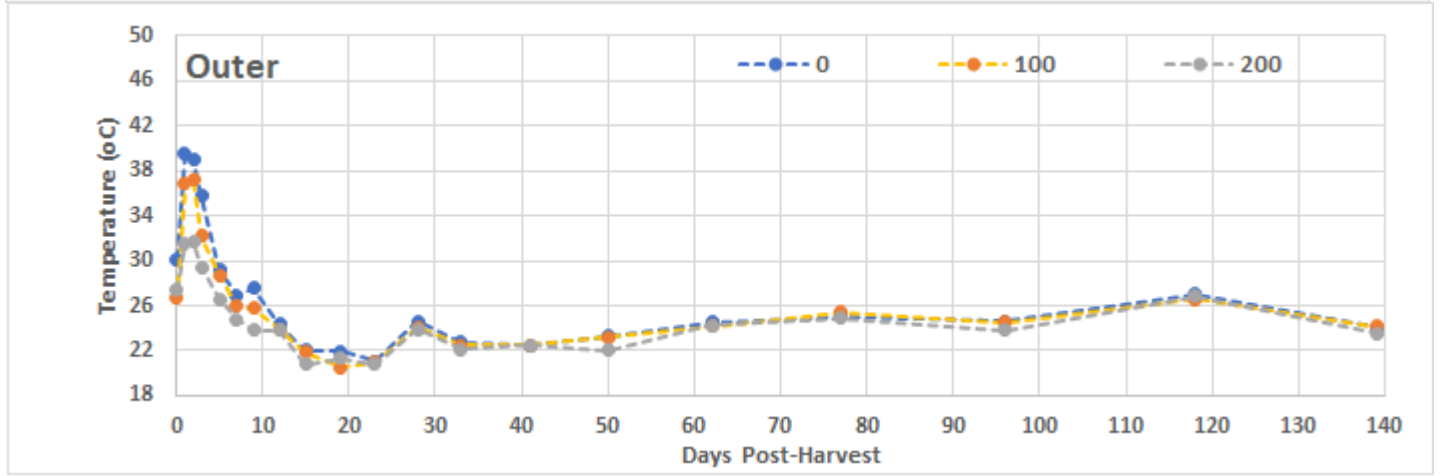


Chopped safflower silage from each treatment waiting for haylage treatment (bailing and wrapping); Material from 1.1 acres; Gombos Brothers in Woodland, California; 4-29-20

Compressed bales of safflower silage at Gombos Brothers in Woodland (4-29-20)

High moisture bail wrapping





Temperature trajectories of wrapped bales of safflower silage baled on 4-29 to 30 (2020) at Gombos Brothers in Woodland. " 'Inner' temperatures are from about 20" depth into the bale while 'outer' temperatures are from about 4" into the bale. Each dot on each plot represents 3 bale measurements. "Keep in mind that heat is created in a bale and is lost from its surface. Thus outer temperatures in a stable bale should move to ambient while inner temperatures will stay a few degrees C higher." Outer and inner temperatures have converged and appear to be stable, indicating silage stability. The rise after May 24 reflects increasing air temperatures. Safflower silage has adjusted to ambient temperatures and is stable.

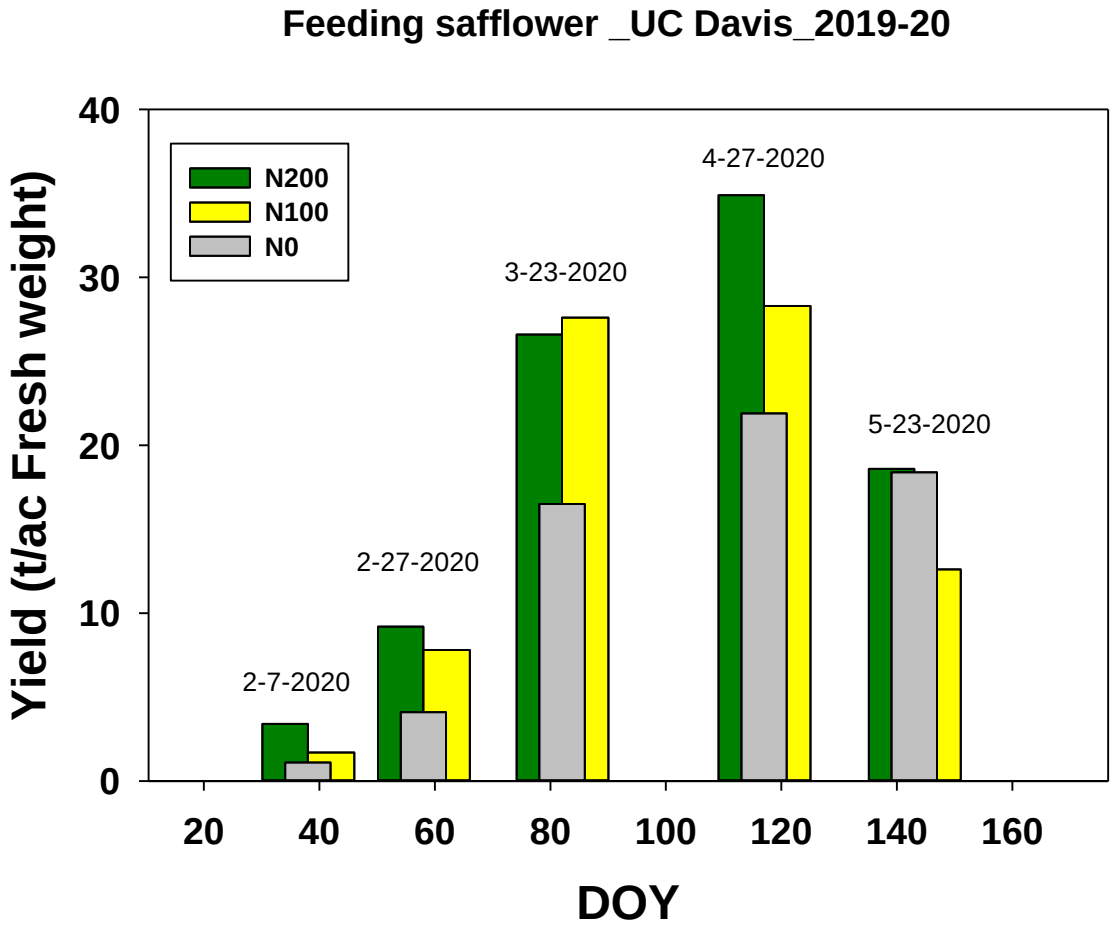
Peter Robinson Data: September 14, 2020

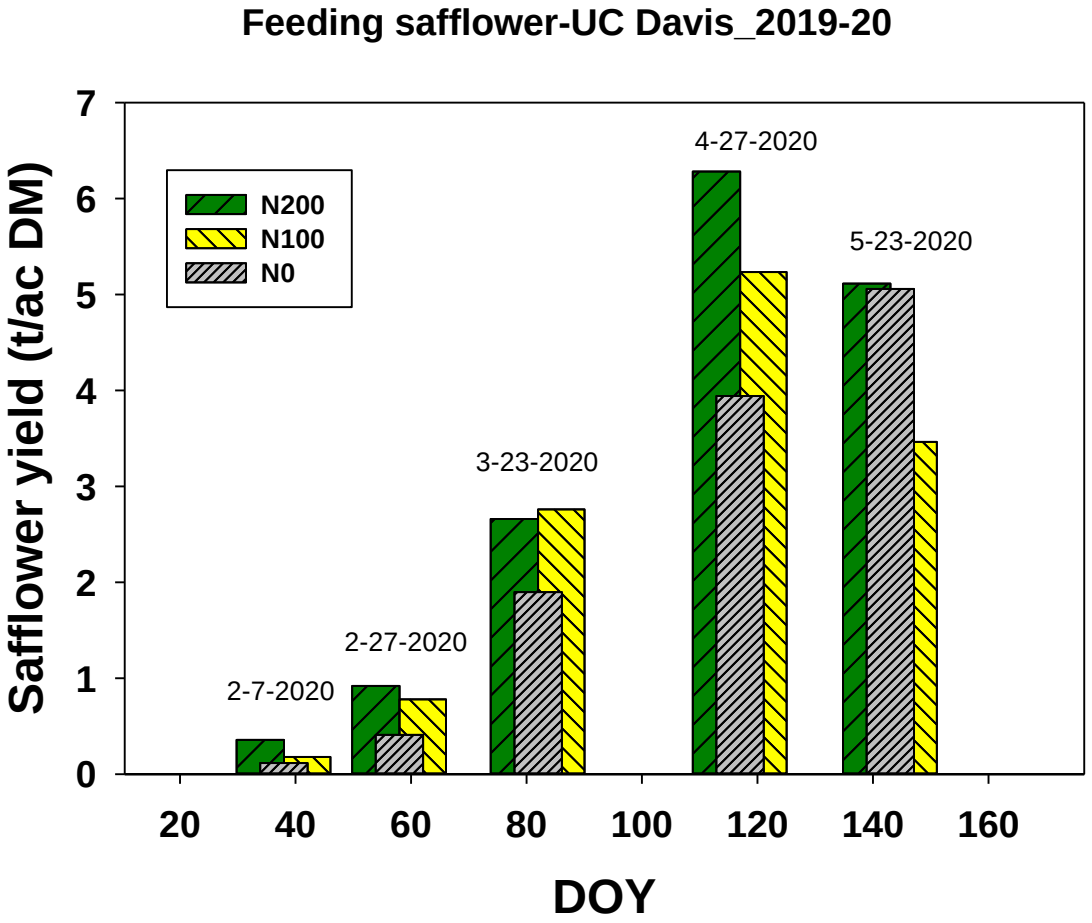
Safflower Composition 40 Days Post-ensiling

	Treatment 100	Typical SJV Wheat Silage
DM, %	33.6	30 to 40
CP, % DM	8.8	8 to 12
ADICP, % CP	12.6	8 to 12
aNDF, % DM	54.4	47 to 55
ADF, % DM	45.0	34 to 38
Fat, % DM	0.6	2.5 to 3.2
Ash, % DM	15.2	11 to 15
Ca, % DM	0.62	0.23 to 0.26
P, % DM	0.19	0.28 to 0.34
Mg, % DM	0.54	0.11 to 0.23
K, % DM	2.25	1.50 to 2.25
Na, % DM	0.04	0.01 to 0.04
S, % DM	0.11	0.15 to 0.20

Peter Robinson data

Safflower silage and small grain silage are very similar in quality. The same equipment used for small grain silage could be used for safflower silage.

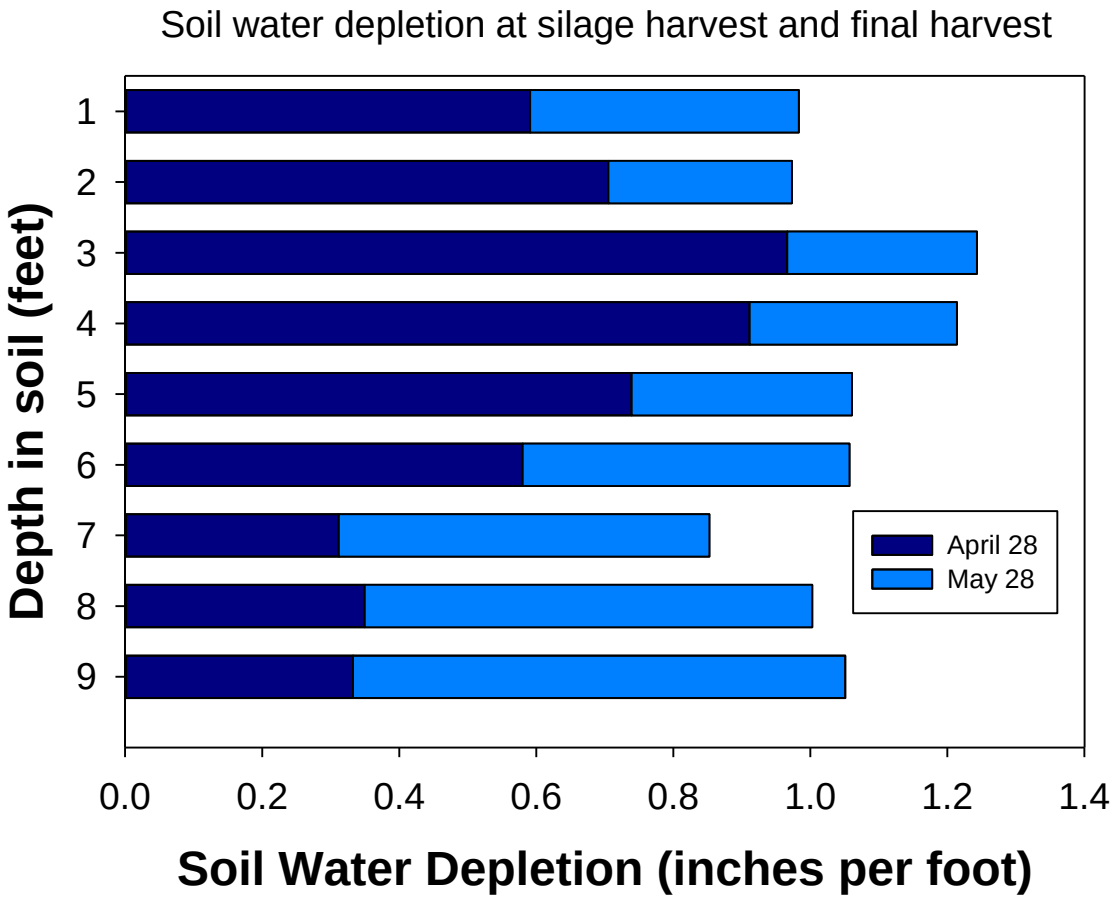


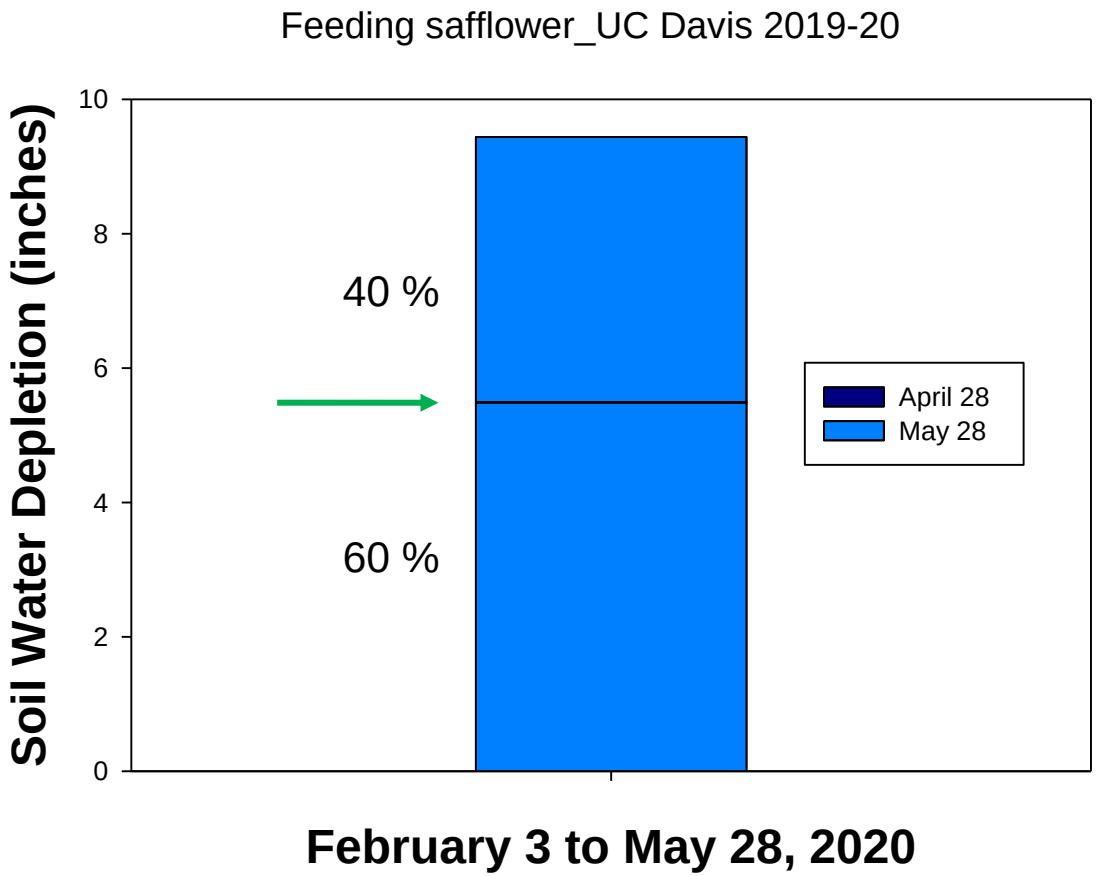


Safflower yield. Left: Fresh Weight (as harvested); Right: Dry Weight. Values are in tons per acre at successive harvest dates. DOY = day of year from January 1, 2020. Planted October 31, 2019. Irrigated November 11, 2019.

Post-harvest soil sampling,
May 1, 2020

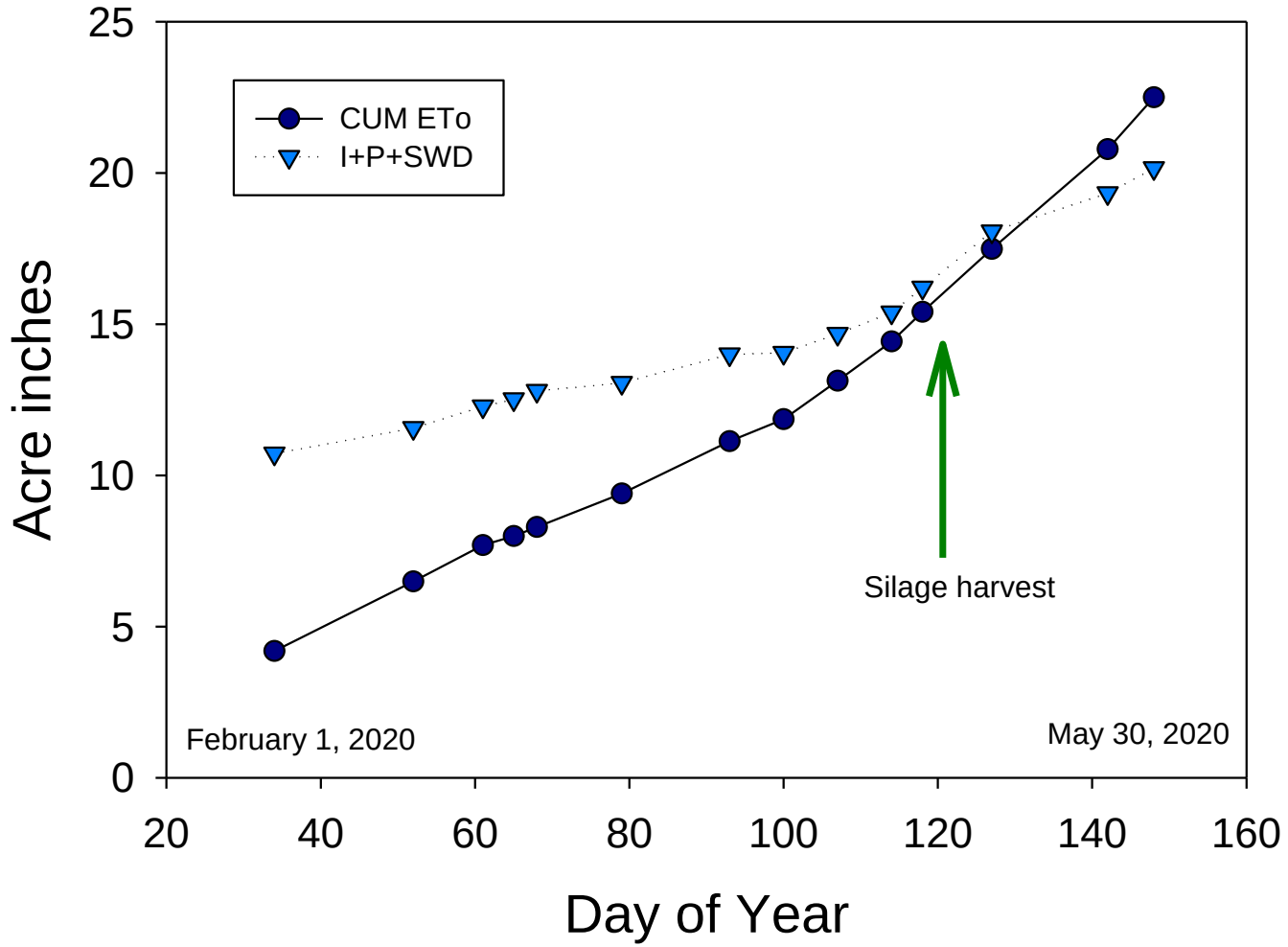
Fresh safflower roots in soil cores collected on May 1, 2020 at 9 feet in depth.



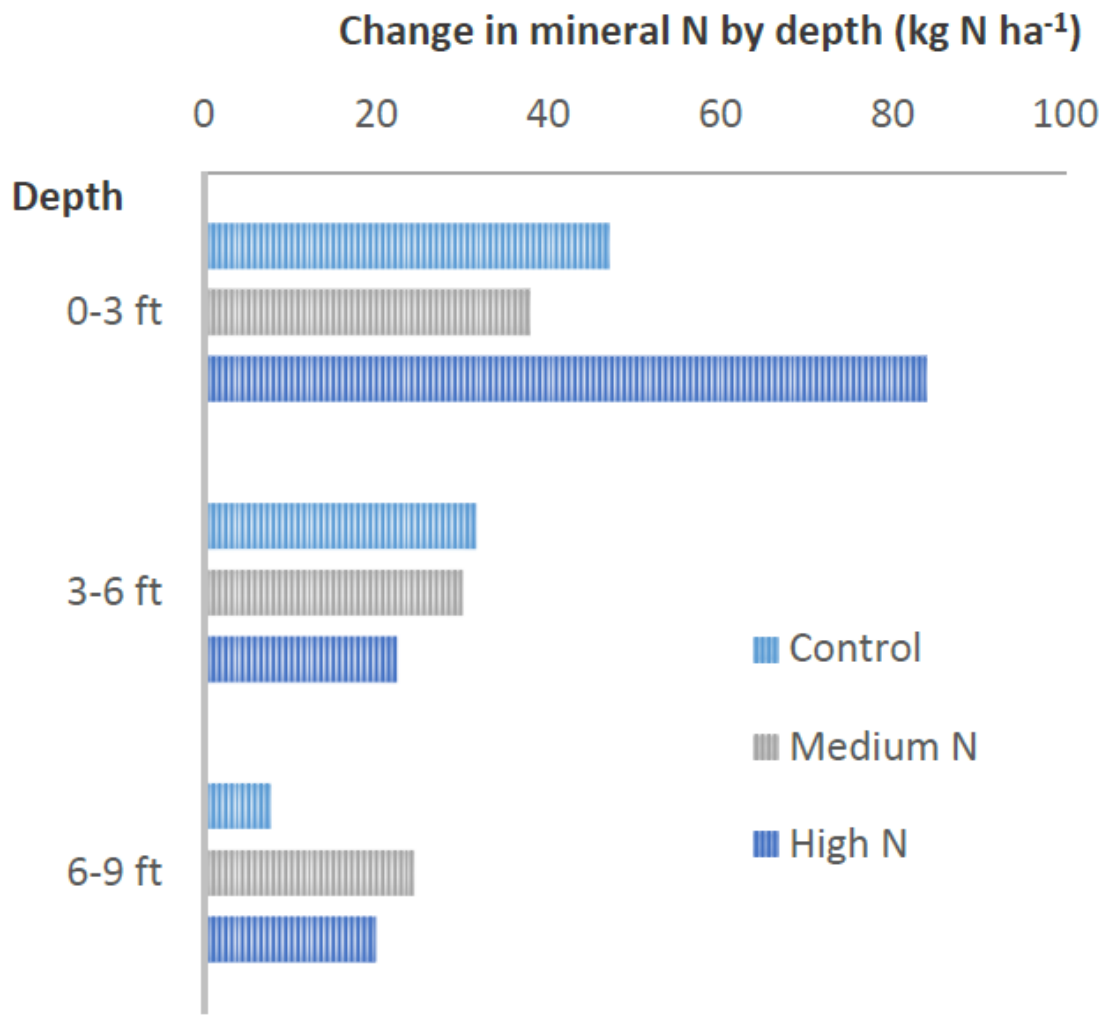


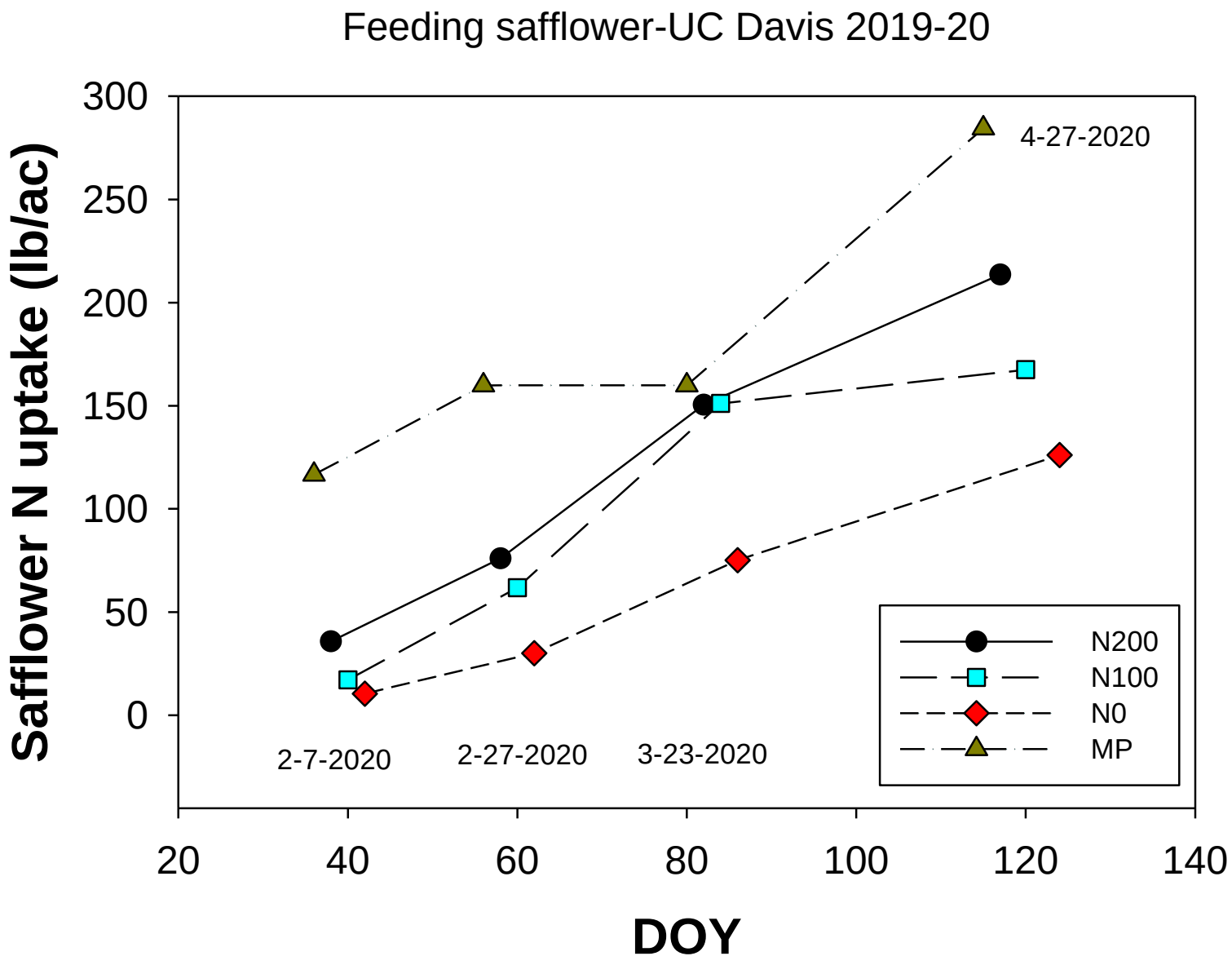
Soil water depletion by depth, estimated using neutron probe data. Total equals 9.4 inches from early February to late April silage harvest (April 28). Additional crop water may have been derived from greater than 9 feet in the profile. Subplots were continued until the end of May to collect additional yield and water use data. From the total used over the 114 day period, 60 % (5.6 ac in) was used prior to silage harvest, and then another 40 % (3.8 ac in) during the last month of growth when temperatures increased. Most soil water was used in the upper 5 feet of the profile at the time of silage harvest and more water recovered from the lower 4 feet of the profile during the last month of growth.

Feeding safflower_UC Davis_Nov 2019 to May 2020



I+P+SWD = Irrigation+ Precipitation +Soil Water Depletion


Change in mineral N by depth (kg N ha-1)
0
20
40
60
80
100
Depth
0-3 ft
3-6 ft
6-9 ft
Control
Medium N
High N


Feeding safflower-UC Davis 2019-20
Safflower N uptake (lb/ac)
300
250
200
150
100
50
0
20
40
60
80
100
120
140
DOY
4-27-2020
2-7-2020
2-27-2020
3-23-2020
N200
N100
N0
MP

Next Steps

- **Feeding beets**:

1. Feeding study, (results useful to nutritionists)
2. Economic modeling based on feeding value with irrigation water limits as a constraint (LP)
3. Third year field and silage trial monitoring and demonstration trial

- **Feeding safflower**:

Trial on a dairy location with earlier start date.

Quantification of water and nutrient use at depth (9 to 10 feet). Under conditions of high(excessive?) fertility on diaries, what amount of nitrate will be recovered.

Can we achieve feed production, feed quality, water and nutrient management goals at an earlier stage of crop maturity?

What is the ideal planting and harvest dates in the SJV?