4 Acre Field Bruce BFT
Athens, NY
Greene County

- **Soil Type: Kingsbury**
- **pH: 6.1 east side of field, 5.8 west side of field**
- **Buffer pH: 5.7, 5.8**
- **P: 2 lbs/acre**
- **K: 161, 142 lbs/acre**
- **Ca: 4334, 4021 lbs/acre**
- **Mg: 873, 865 lbs/acre**
- **% OM: 7.8, 7.7**

Field History and Soil Preparation

- 2012 - Cover cropped with cereal rye and incorporated 23 loads of composted goat manure.
- 2013 – planted peas, oats, vetch and crimson clover in the spring, hayed in the summer, grazed in the fall, then disked.
- 2014 – Took soil samples (slide 1) in April, 2014. Planted soybeans in the spring (seeder cracked much of the seed and got poor stand), turnips in the summer and cereal rye cover crop in the fall.

Planted BFT in Spring 2015 with a nurse crop of oats

- Incorporated 8 loads of composted wood chips and Sulfur 90% (50 lb./acre) on May 7, 2015 shortly before planting.
- Bush hog field cultivator – 2 passes, tandem disc harrow – 4 passes, cultimulcher – 4 passes
- Planted on May 8, 2015 – 17.5 lb. BFT/acre (variety was Bruce) and 50 lb. Everleaf 126 oats/acre using Massey Ferguson 33 Grain Drill
- Firmed seedbed afterwards using 2 roll cultipacker – 2 passes

Management of BFT field in 2015

- Followed up planting with a foliar application of Neptune's Harvest (Hydrolyzed Cold Processed Fish, 3 gal/acre) and Sea 90 Minerals (5 lb./acre), on May 9th, 2015
- BFT emerged on May 13th
- Grazed oats with goats from July 12th through 20th and clipped ungrazed portion on July 25th.
- Followed by foliar application of Neptune's Harvest (Hydrolyzed Cold Processed Fish, 5 gal/acre) and Sea 90 Minerals (5 lb./acre) and soluble Boron 20% (5 lb./acre) on July 26th.

Table 1. Birdsfoot Trefoil Stand Measurements on Aug 14th, 2015 in 2.11 sq. ft. samples

# of Plants of :	Birdsfoot trefoil	Grasses[1]	Broadleaf weeds and forage legumes[2]
Sample #	# of plants in a 2.11 sq. ft. sample		
1	88	116	96
2	108	554	117
3	5	52	108
4	28	10	39
5	30	92	42

[1] Grasses were fall panicum, barnyard grass and foxtails that would die off after winter but there were concerns that they might be crowding out BFT plants.
[2]Broadleaf weeds were primarily galinsoga, also some clovers.

(cont.) Management of BFT Field

- Concerned that BFT plants were being outcompeted by fall panicum and not getting much chance to grow and might be prone to winter kill. Baled for hay Sept 16th, 2015. Forage was mostly fall panicum.

- Followed by foliar application of Neptune's Harvest (Hydrolyzed Cold Processed Fish, 3 gal/acre) and Sea 90 Minerals (5 lb./acre) on Sept 21st .

- Frost seeded 5 lb. more of Bruce BFT per acre on March 4th , 2016 (spinner spreader) because of concerns about possible winter kill.

Kid Management

- Grass fed herd of 43 does and 82 kids
- Male kids used for study were born from Mar 31st through Apr 15th 2016
- Kids ranged from 50 to 100% Kiko. Remainder of genetics included Boer and Dairy breeds such as LaMancha.
- Got BoSe injections within 3 days of birth, Clostridium C&D and Tetanus boosters at 6 and 10 wks. old
- The male kids were weaned on July 3rd and left in barn with hay while the does and doe kids went back out to pasture.
- Grazing trial started July 6th .

BFT Treatment Kids

- Birdsfoot trefoil (BFT) group – Nine male kids (7 bucks, 2 wethers)
  - kept in the BFT pasture 24/7 for 8 weeks with a movable shelter and electronet fencing.
  - During the first 6 wks., approximately 39000 sq. ft. (130'*300') were fenced in every 14 to 16 days and kids were given a new 65'*150' (9750 sq. ft.) section of this plot ~every 4 days. They could backtrack through the previous quarters of the plot but rarely did. After 4 moves (i.e. 4 quarters), the shelter and fencing were moved farther down the BFT pasture.
  - The remaining pasture became mature as the study progressed, so the last plot was mowed before the kids got to it. Therefore it had less biomass when the kids reached it and kids were given sections that were approximately doubled in size (135'*150', ~20250 sq. ft.') every 4 to 5 days for the last 2 wks. of the study.

Standard set up for BFT group

Conventional/Annual Pasture Kids

- “Conventional/Annual pasture (CAP) group – Nine male kids (all wethers).
- Two missed the 1st sampling period because they were not added to the study until the next day. One had been dewormed on June 22nd and the other on July 3rd so the farm was unsure if they could still be used for the study.
- The kids were on permanent pasture for 4 weeks, returning to the barn every night. Four of the 9 kids were dosed with copper oxide wire particles (COWP) at the end of week 4.
- The group then rotated through the regrowth of an annual pasture of brassicas, cowpeas, millet and sorghum sudan for the last 4 weeks, returning to the barn every night.

CAP kids were returned to a pen in the barn every night


All study kids were brought to the barn every 2 weeks for sampling

Fecal samples were collected to send to Virginia Tech for analysis and for larval cultures. A procedure called PNA was run on duplicate samples at Cornell Univ. to identify the percentage of strongyle eggs that were barber pole worms at the beginning (91%) and end of study.

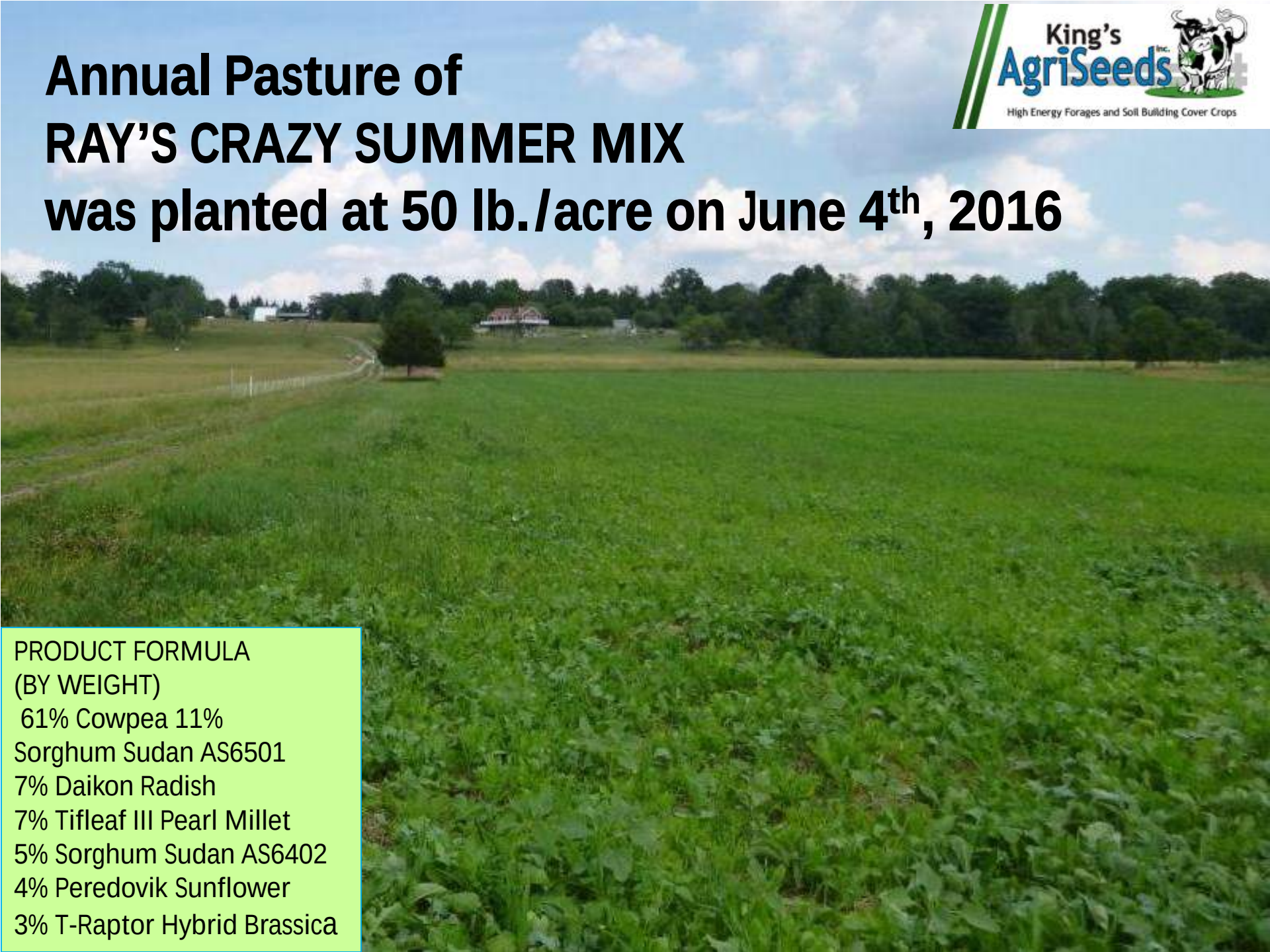
Working area was dark so a high intensity 500 watt quartz work light was used above chute for FAMACHA scoring


Goats were FAMACHA scored under the light and then run over scale for weighing.

Weights were recorded every 2 weeks

Control kids spent the first 4 weeks on a grass/legume permanent pasture that had been mob grazed by the main herd from May 29th – 31st . Kids got a 125' *250' section (31250 sq. ft.) for 1 week and were then set stocked on the entire pasture. Pasture was fairly mature on July 6th despite earlier grazing. Dry Matter averaged 1884 lb./Acre on July 6th and 2299 lb./Acre on July 21st.

Annual Pasture of RAY'S CRAZY SUMMER MIX was planted at 50 lb./acre on June 4th, 2016



King's AgriSeeds Inc.
High Energy Forages and Soil Building Cover Crops

PRODUCT FORMULA
(BY WEIGHT)
61% Cowpea 11%
Sorghum Sudan AS6501
7% Daikon Radish
7% Tifleaf III Pearl Millet
5% Sorghum Sudan AS6402
4% Peredovik Sunflower
3% T-Raptor Hybrid Brassica

Annual pasture emerged on June 9th, Photo on July 6th


Started strip grazing with doe herd
on July 22nd . Photo taken Aug 4th .

CAP and CAP/COWP kids were combined with a group of 51 doe kids and yearlings and started on annual pasture regrowth ~Aug 4th.


Dry Matter averaged ~3162 lb./Acre on Aug 4th.
The herd of approximately 60 kids and yearlings
Strip grazed ~15000 sq. ft. (50'*300') every 5 days.

Regrowth on left is ~6 days after kids have left area
while regrowth on right is about a day after leaving


Dry Matter of the portions they were still due to go on averaged 1750 lb./Acre on Aug 16th


However these portions were growing back rapidly


Unlike the conventional pasture, the BFT pasture had not been grazed that year but had been mowed on May 21st to control mustard. Forage was also fairly mature by July 6th


On July 6th,
dry matter biomass was 40.8% BFT,
red clover was also prominent.
Total DM yield ~4396 lb./acre.

BFT on July 21st was 3331 lbs. Dry Matter/Acre, 32.7% BFT

BFT on Aug 4th was 3230 lbs. Dry Matter/Acre, 23.3% BFT

By Aug 4th, the BFT section the kids were grazing had a lot of mature red clover in it. On July 26th , the farmers mowed the remaining pasture the kids were scheduled to move on to because of how mature it was.


Aug 4th, BFT pasture 9 days after mowing and shortly before
Kids were moved into it for grazing.

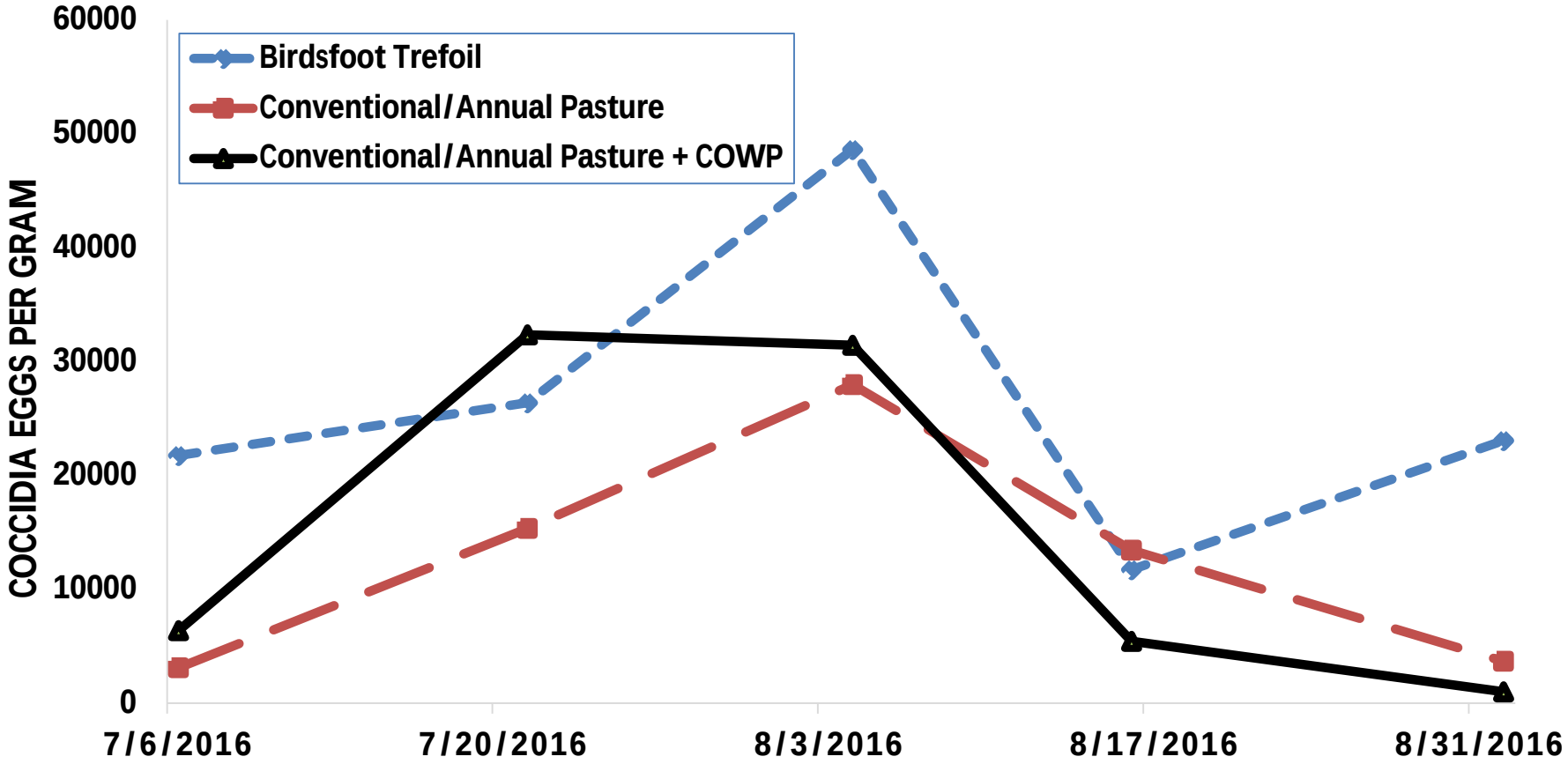
Photos of BFT regrowth (mowed 7/26) that kids were grazing on Aug 16th, 1570 lb. Dry Matter/Acre and 50% BFT

Table 2. Dry Matter Yield/Acre for Pastures and Amount and Percentage of Birdsfoot Trefoil in BFT Pasture

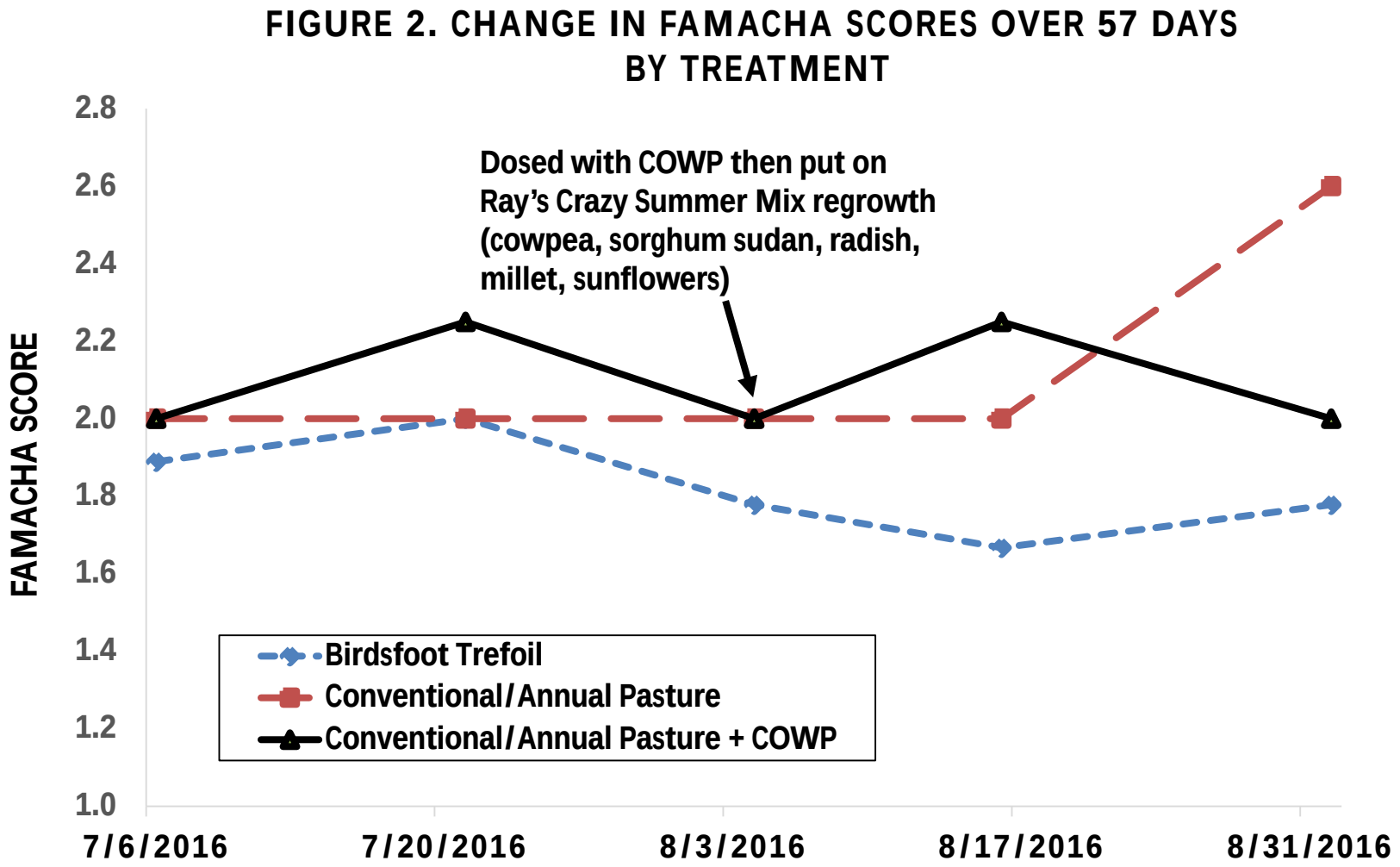
	BFT Pasture			Other Pasture
Date	DM Yield (lbs./acre)	BFT Yield (lbs./acre)	%BFT	DM Yield (lbs./acre)
7/6/2016	4396	1794	40.8%	Permanent 1884.1
7/21/2016	3331	1088	32.7%	Permanent 2299.0
8/4/2016	3230	751	23.3%	**Annual** - Ray's Crazy Mix Regrowth 3162.5
8/16/2016	Mowed 7/26 1570	785	50.0%	**Annual** - Ray's Crazy Mix Regrowth 1749.5

Kids were weaned 3 days before the grazing trial began. Average coccidia counts increased during the first 4 weeks and then appeared to drop in all 3 treatments

FIGURE 1. CHANGE IN COCCIDIA EGG COUNT (EPG) OVER 57 DAYS BY TREATMENT

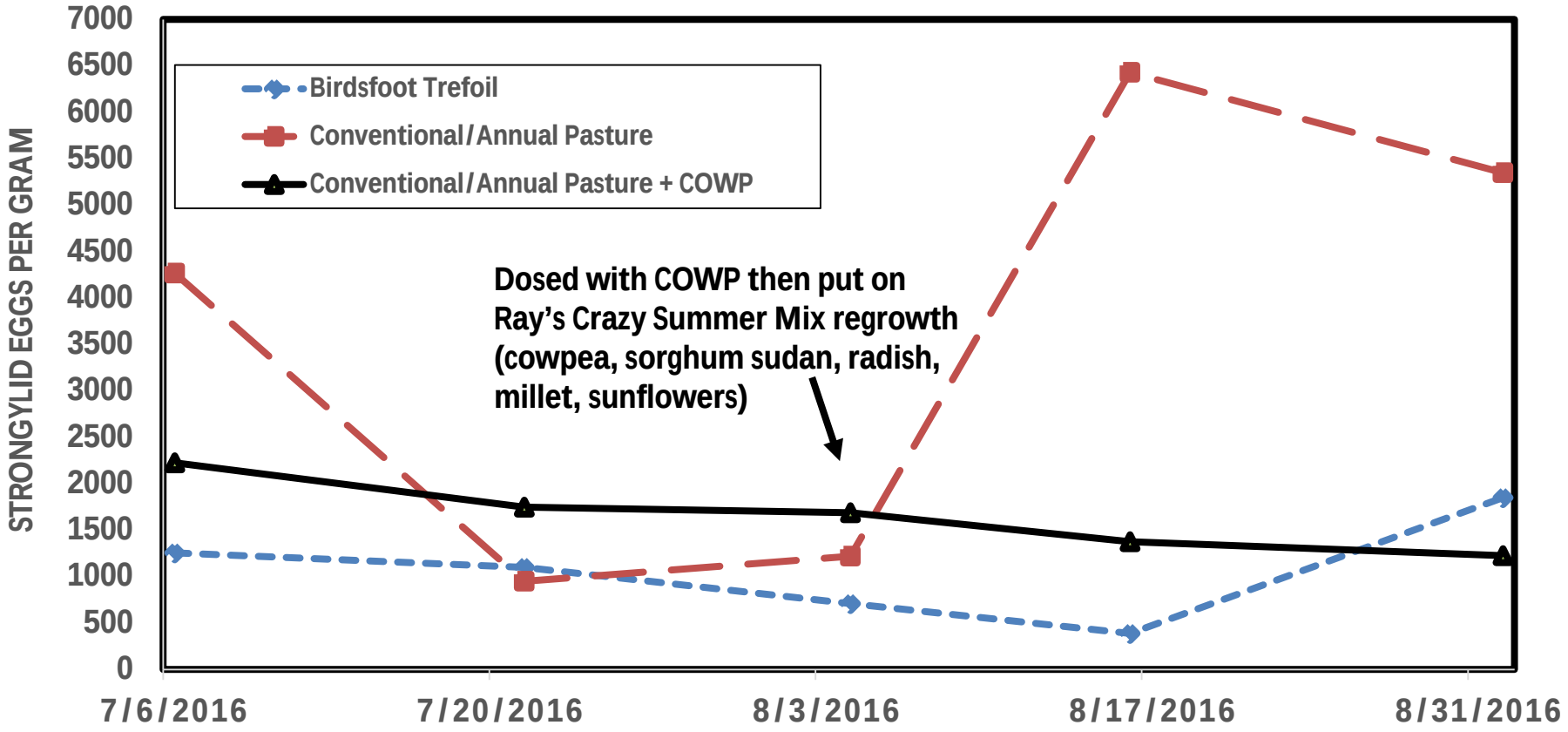


Differences in FAMACHA scores approached statistical significance for Forage (BFT versus non BFT; P=0.07), but not for the effects of COWP dosing, Day or Forage*Day



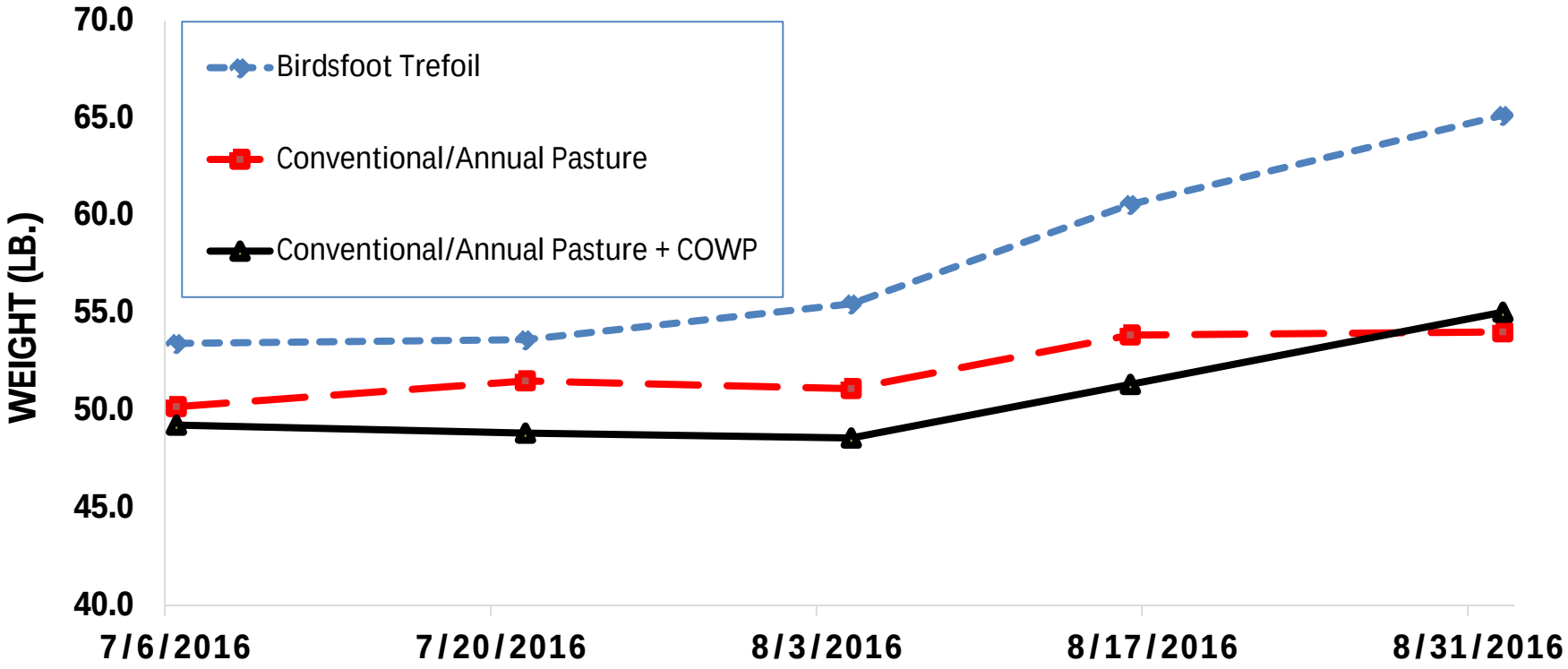
Differences for Strongyle Worm Egg Counts were statistically significant for Forage (BFT vs. non BFT; P=0.007), COWP dosing (P=0.005), Day (P=0.000) and Forage*Day (P=0.028). One kid on the CAP treatment had to be dewormed at the end of the study because of FAMACHA score of 4 and very high worm count for last 2 sampling periods.

FIGURE 3. CHANGE IN STRONGYLE WORM EGG COUNT OVER 57 DAYS BY TREATMENT



The kids grazing BFT gained significantly more (P=0.022) over the 57 days of the study than the kids on the Conventional/Annual Pasture (CAP and CAP/COWP) treatments.

FIGURE 4. WEIGHT GAIN (LB.) OVER 57 DAYS BY TREATMENT



Gain for the CAP and CAP/COWP treatments appeared to improve after they were moved onto annual pasture regrowth and especially after some received copper oxide wire particles (COWP).

Table 3. Weight Gain by Treatment (P < 0.022) during 57 d. Grazing Trial

	BFT	CAP	CAP + COWP
Date	Weight (lbs.)		
7/6/2016	53.4	50.2	49.3
7/21/2016	53.6	51.5	48.9
8/4/2016	55.5	51.1	48.6
8/16/2016	60.6	53.9	51.4
9/1/2016	65.2	54.0	55.1
Gain (lbs.)	11.7	3.8	5.8
Days	57	57	57
Daily gain (lbs.)	0.21	0.07	0.10