EFFECT OF ANNUAL GRASS WEEDS ON ALFALFA ESTABLISHMENT, YIELD AND FORAGE QUALITY

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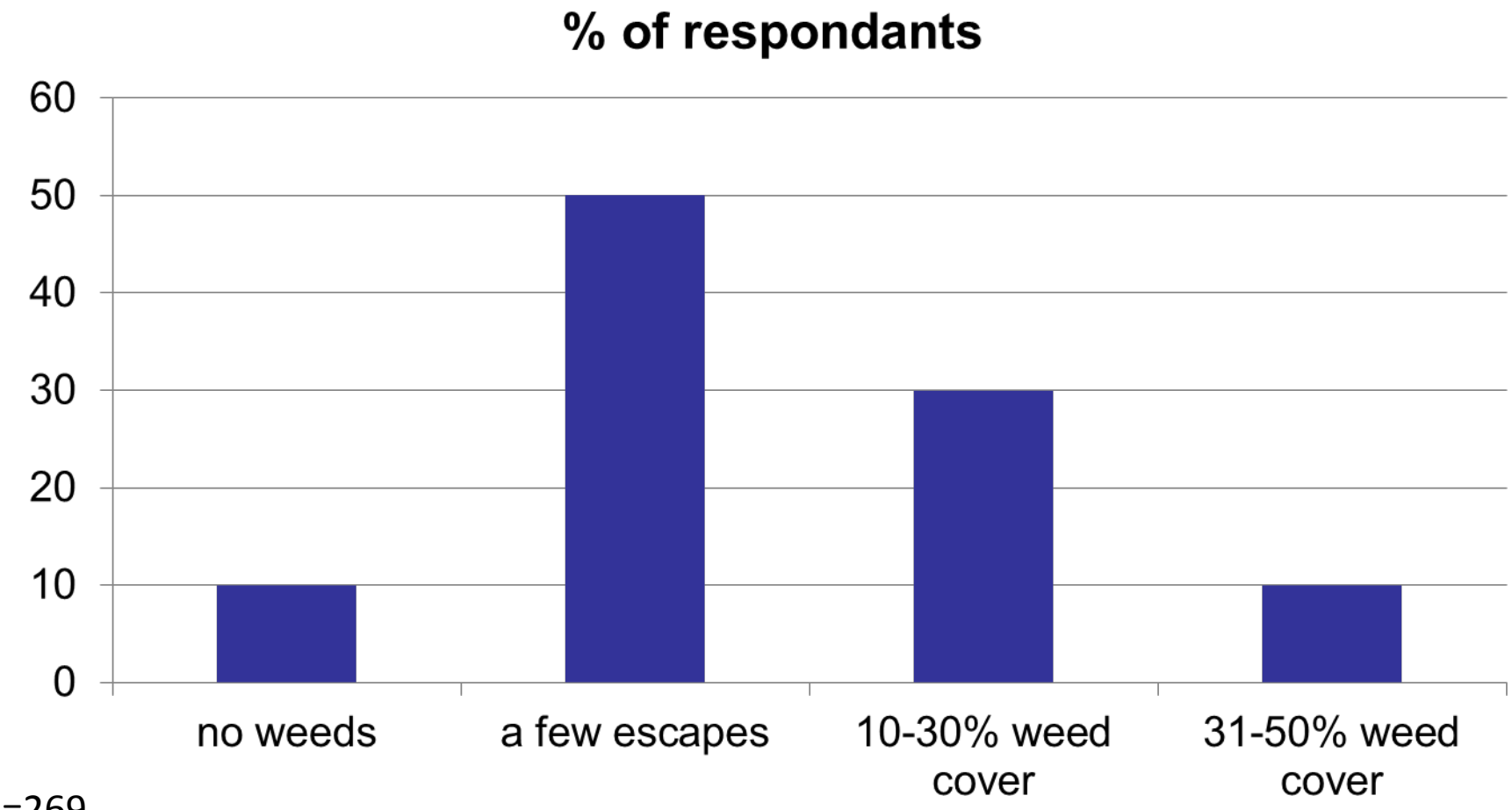
When establishing alfalfa:
Why manage weeds?

1. Maximize alfalfa yield
   - Maximize forage quality
   - Maximize milk production

2. Prevent alfalfa stand loss
   - Future harvests won't be impacted

Most people can tolerate weeds when establishing perennial forages

survey of crop consultants and educators 2013



N=269

Why the tolerance?

- Weeds are a **decent** forage
  - Contribute to forage biomass (increase yields)
  - Forage quality reductions observed when major part of the forage (>20%)
  - Typically an issues only in first cutting
  - **Low (?)** populations don't impact alfalfa establishment

Which weeds are the worst?

- No consensus, we are focusing on:

Previous work (2012) in broadleaf weed infested fields

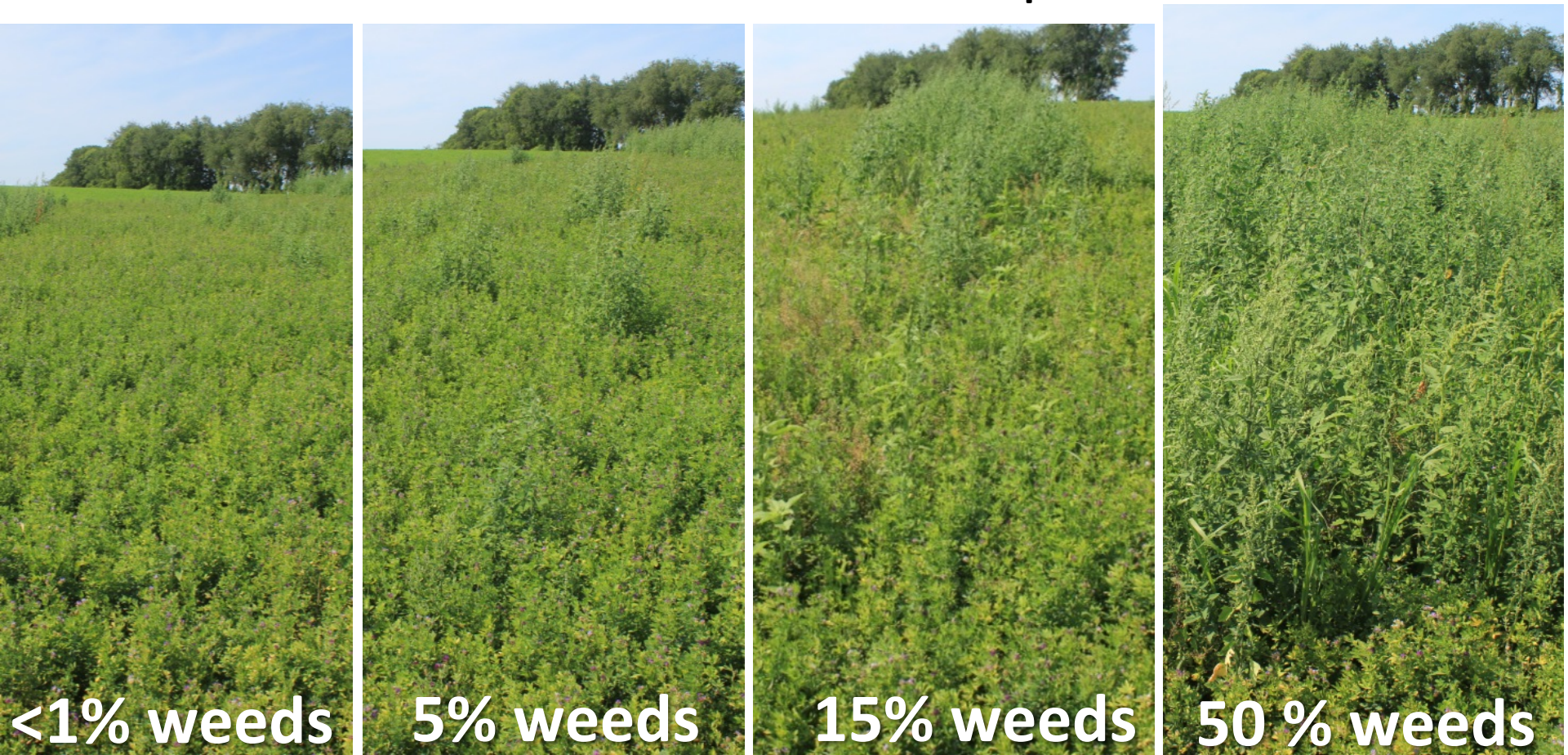
Conducted at 7 locations in WI (6 on farm)

- Untreated plots had 34% more forage yield
  - 50% of biomass was weeds in untreated vs 5% in treated
  - RFQ was reduced by weeds
    - **when weed biomass was >20%**
      - MILK/Ton or /Acre was not estimated

- Alfalfa plant density was similar between weedy and herbicide treated plots

Suggests a threshold or tolerance of weed populations may exist!

- Where is the threshold?
- Do results differ between weed species?



2014 alfalfa establishment trial

Arlington 2014

- Goal was to obtain a range of weed populations
  - Annual grasses and broadleaf weeds

- How we tried to obtain these ranges:
  - Applied grass and/or broadleaf specific herbicides
    - Select, Poast Plus, Butyrac
  - Applied at two different timings
    - 1-2 vs 3-4 TL alfalfa

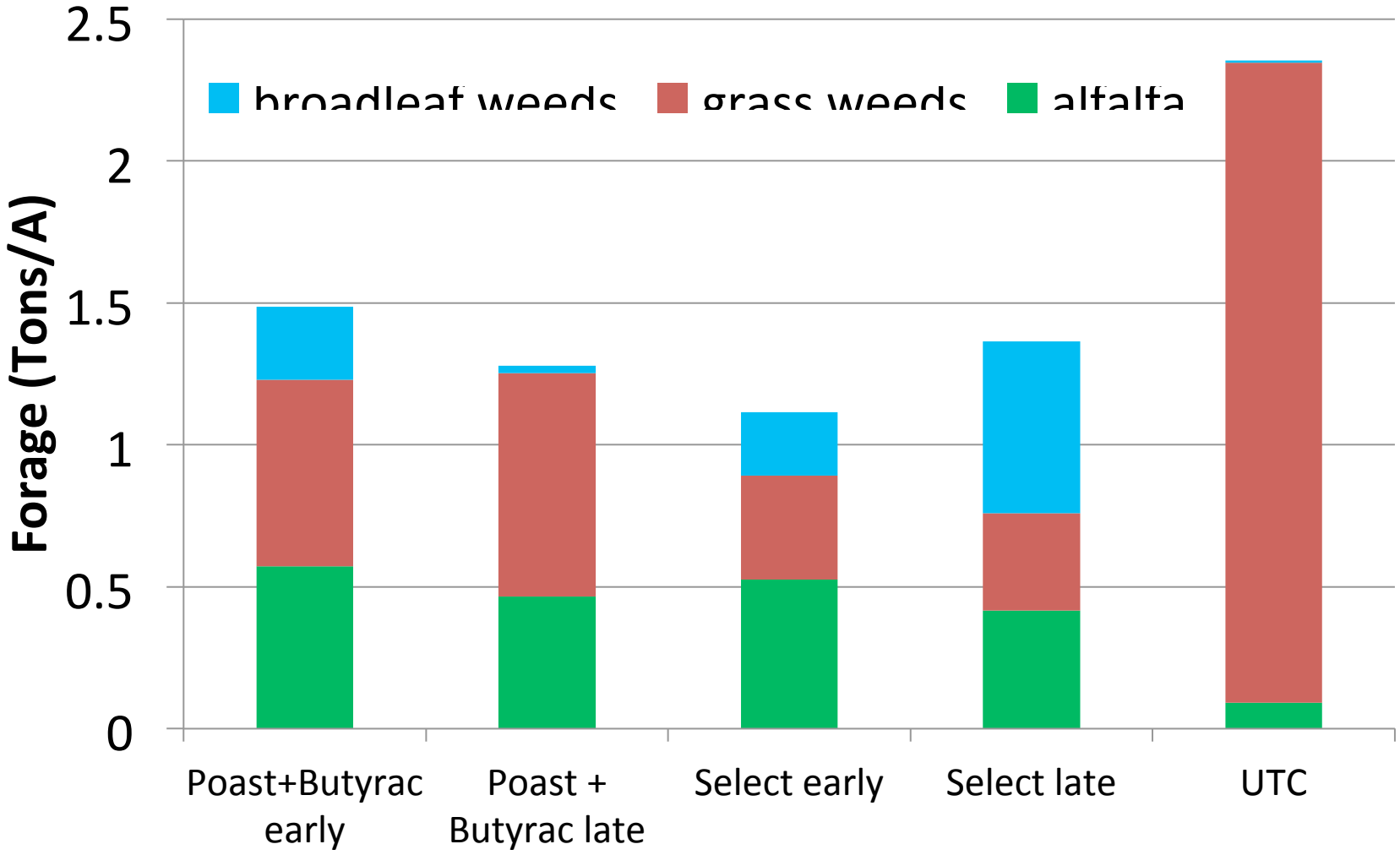
Level of weed control

Why such poor control?

- A lot of rain
  - 7 rain events between treatment and 1st harvest
- No residual herbicides
- Late planting date
  - (5/28)
- Large weed seedbank
  - Giant foxtail

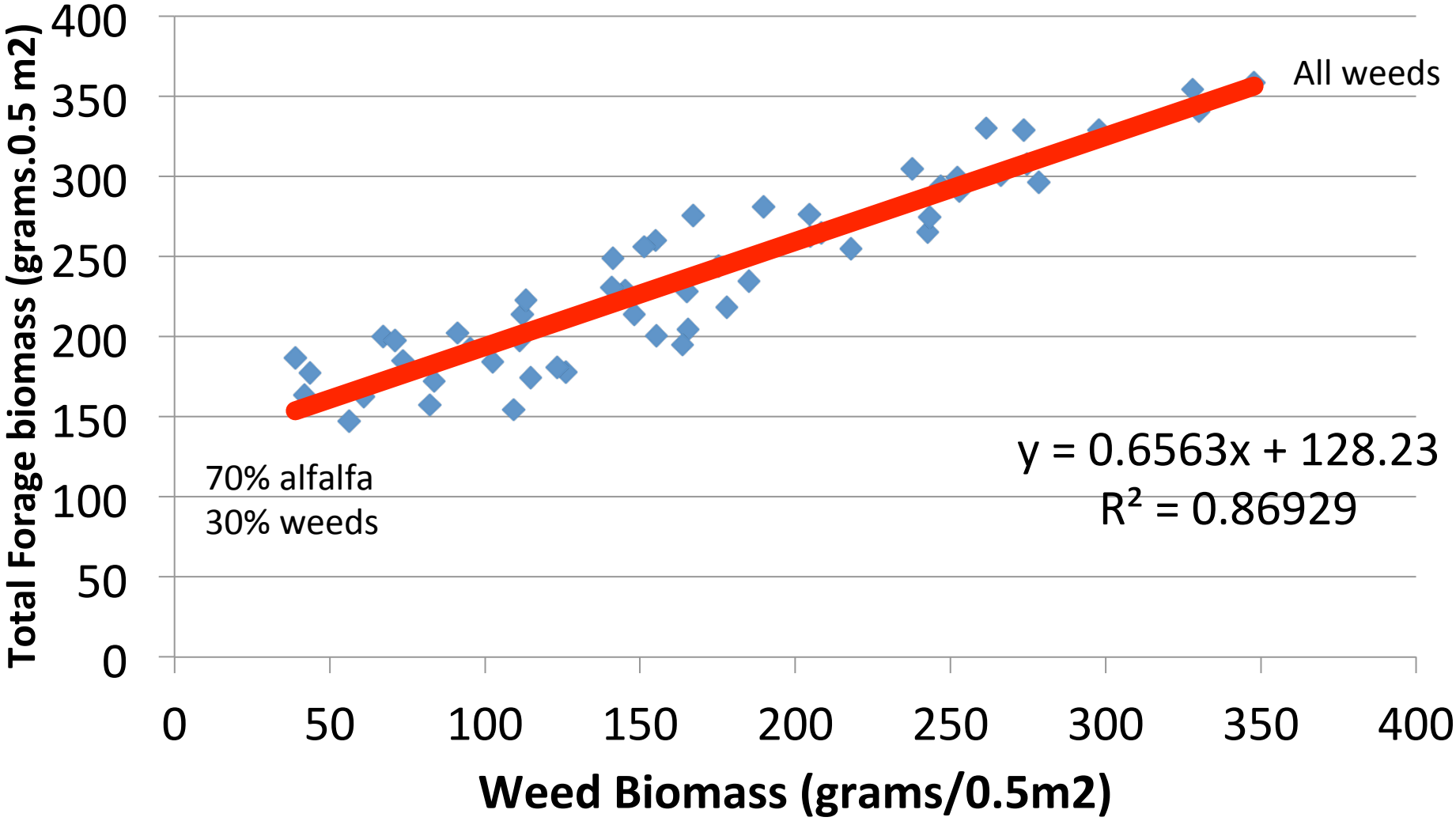
Yield in 1st harvest establishment year

Arlington 2014

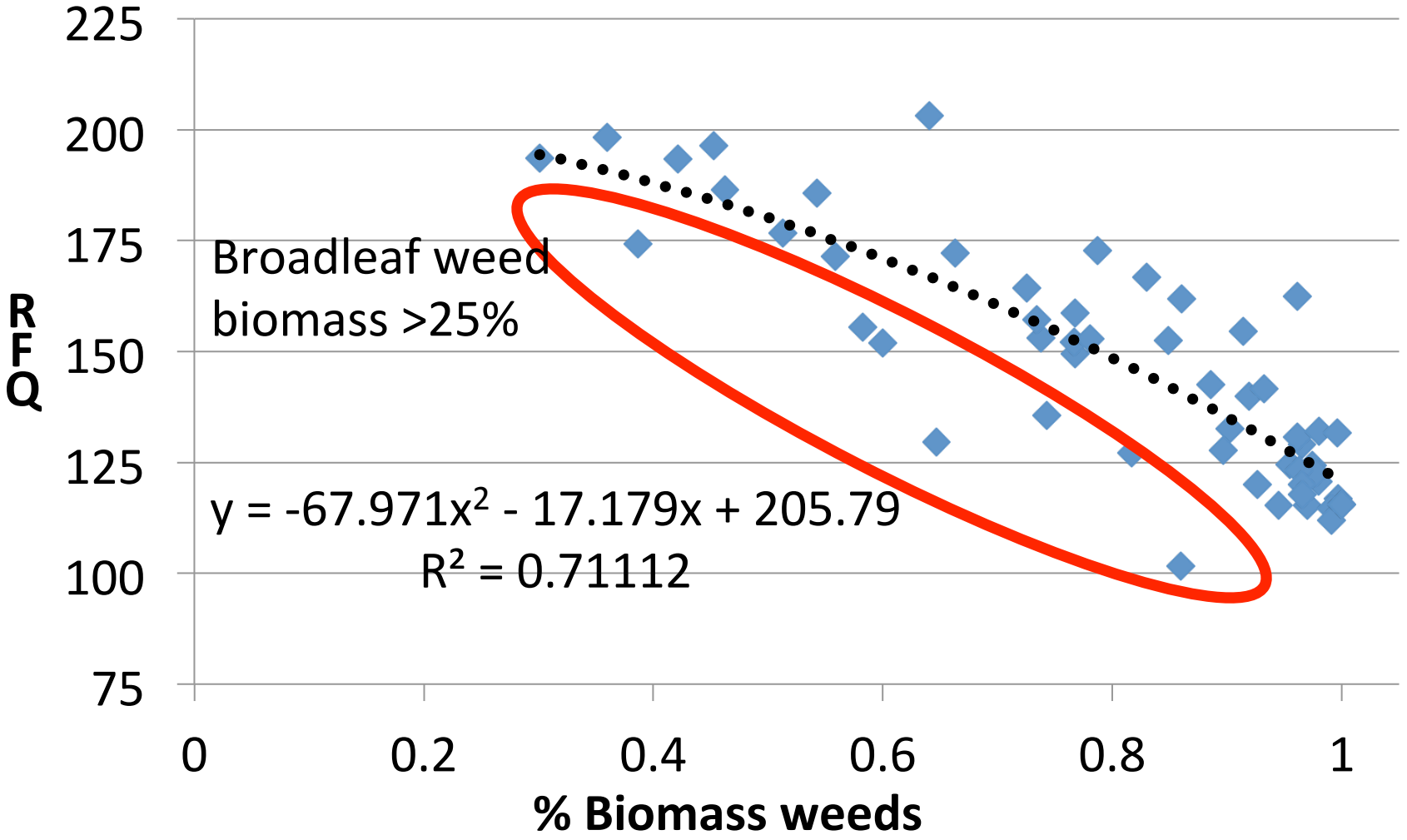


More weeds = More Forage

Combination of 1st and 2nd cut

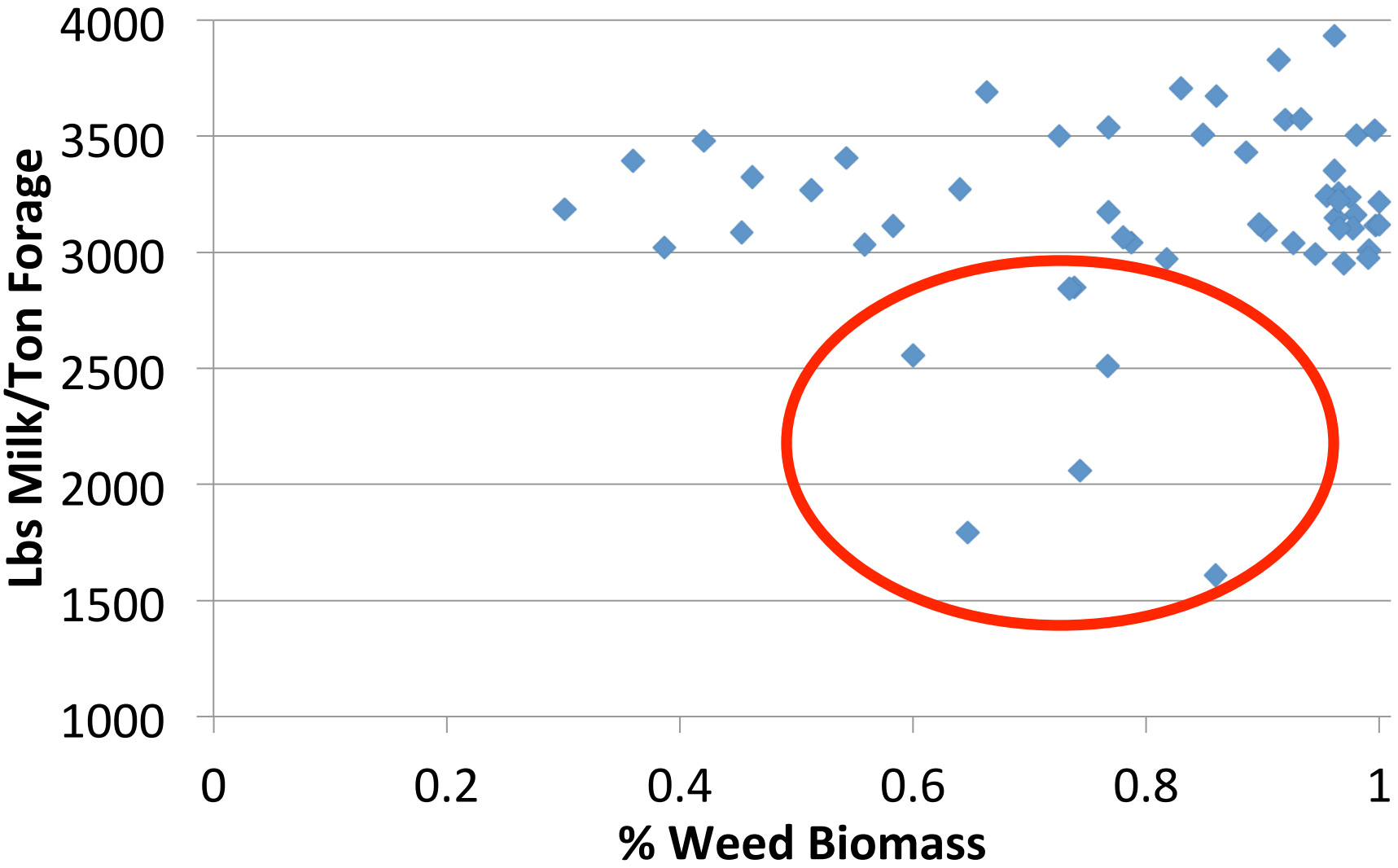


Weed impact on forage quality (RFQ) in the 1st cut



Impact on milk production 1st cut

Used MILK MODEL to estimate



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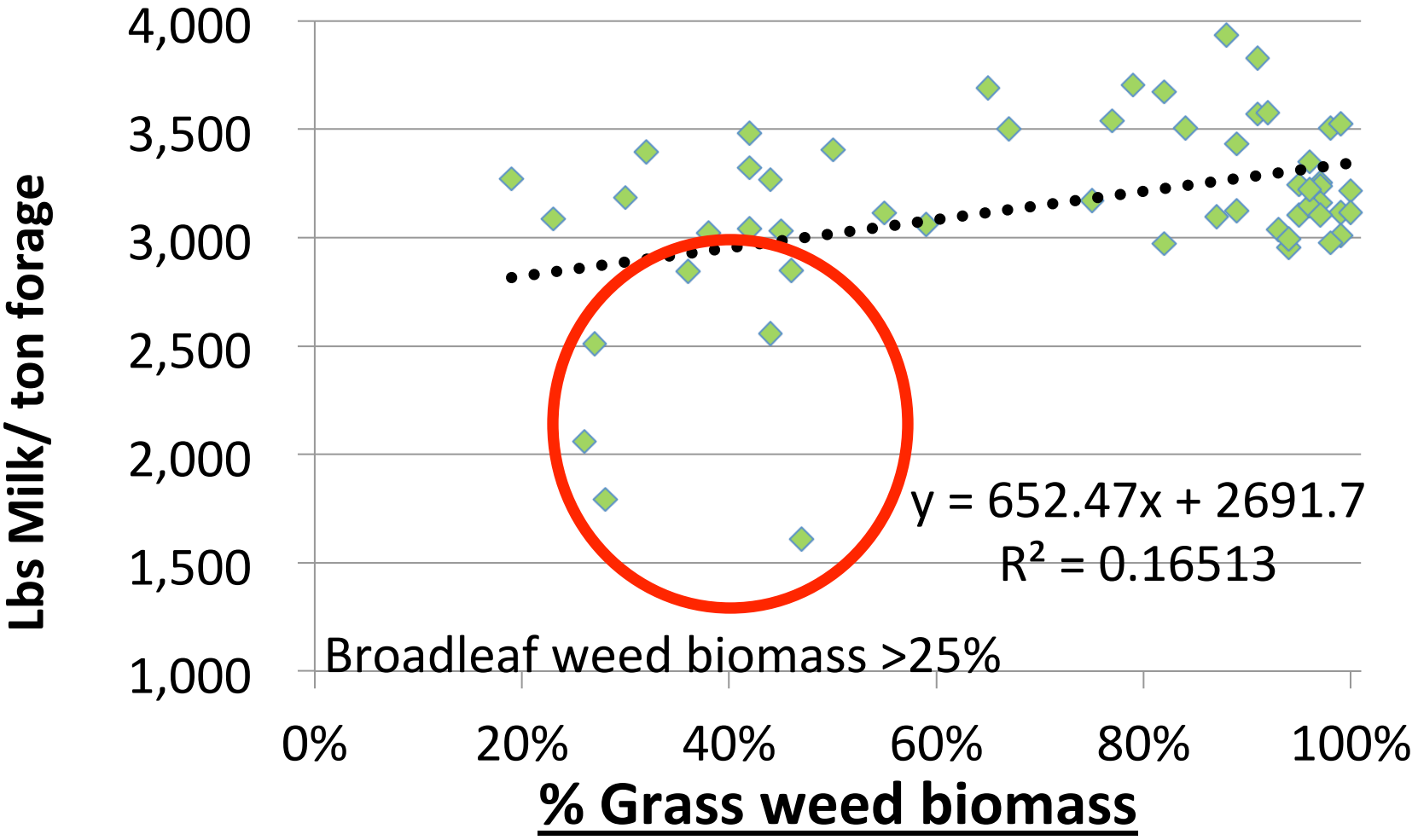

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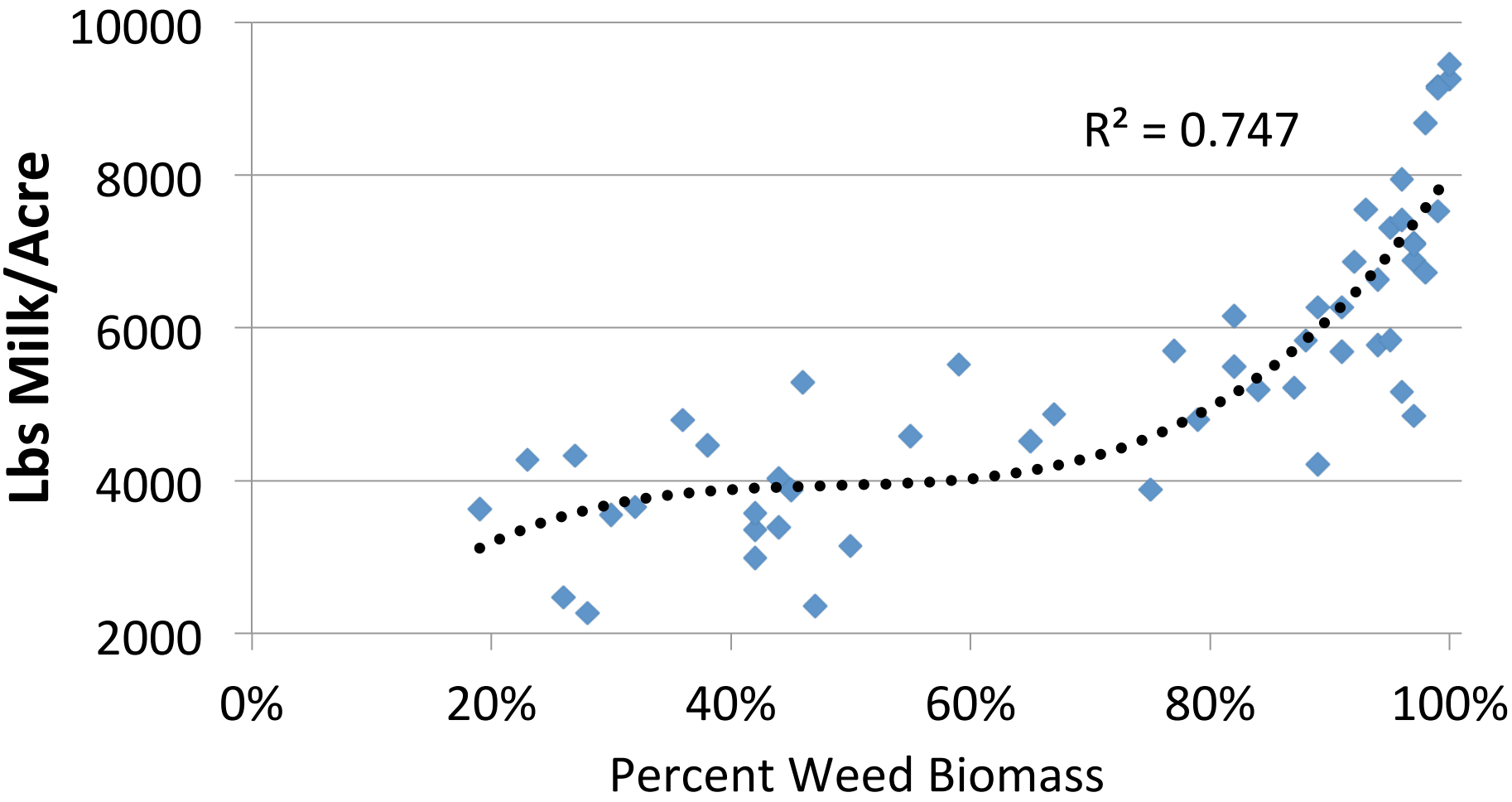


Why did grasses improve MILK?

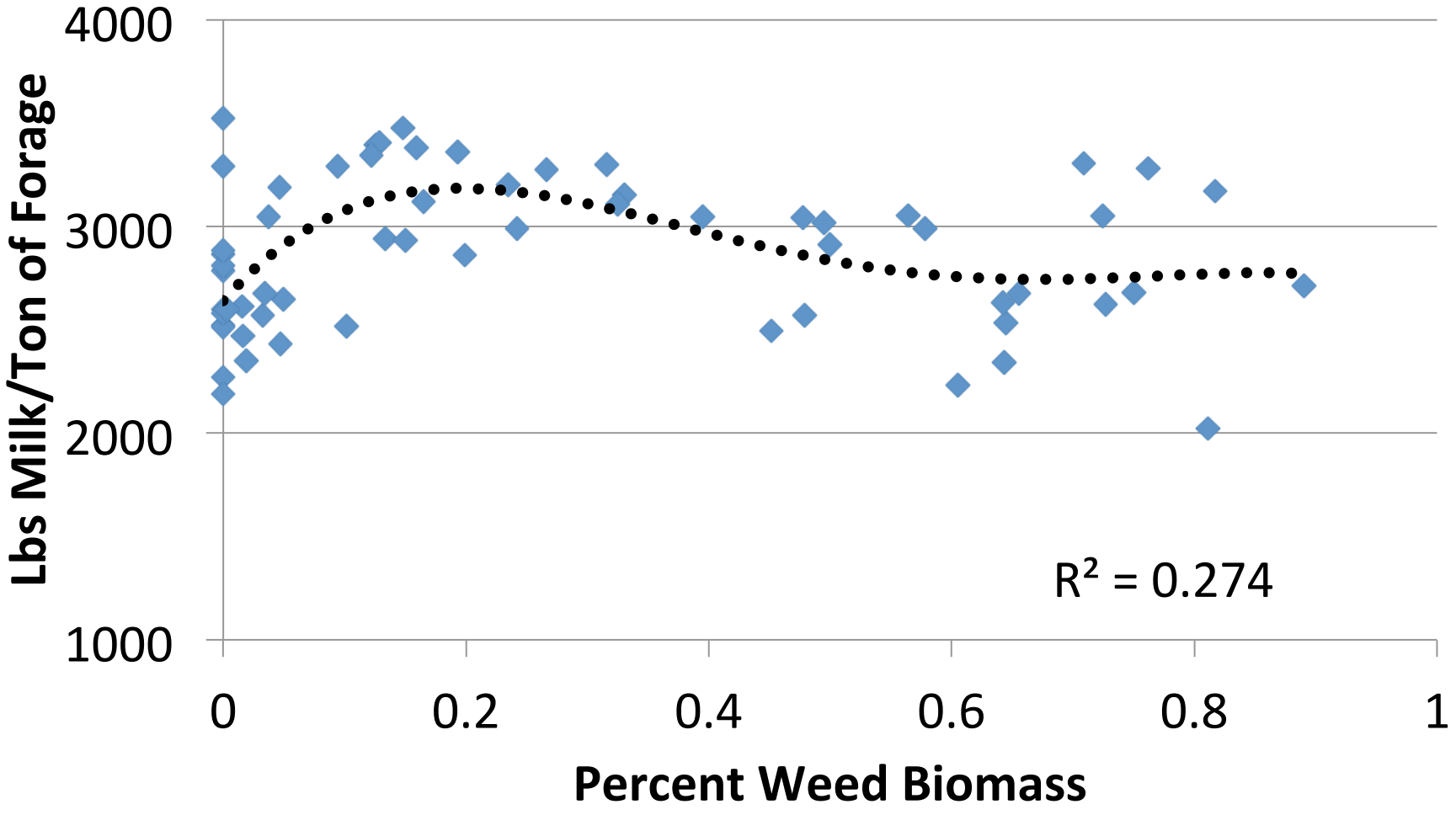
- Grasses increased productivity
  - Untreated plots yield = 2.25 Tons/A (mostly grass)
  - Treated= 1.0-1.5 Tons/A

- Forage quality was decent as **grasses were mostly vegetative when harvested**
  1. Pure alfalfa RFQ = 206
  2. Pure annual grasses RFQ = 125
  3. 50/50 mixture RFQ= 180
  4. 75% grass, 25% alfalfa RFQ = 155
  5. 30% alfalfa, 30% grass, 40% broadleaf RFQ= 125

Broadleaf weed development 1 month prior to harvest

How do these results compare to 2012 research?

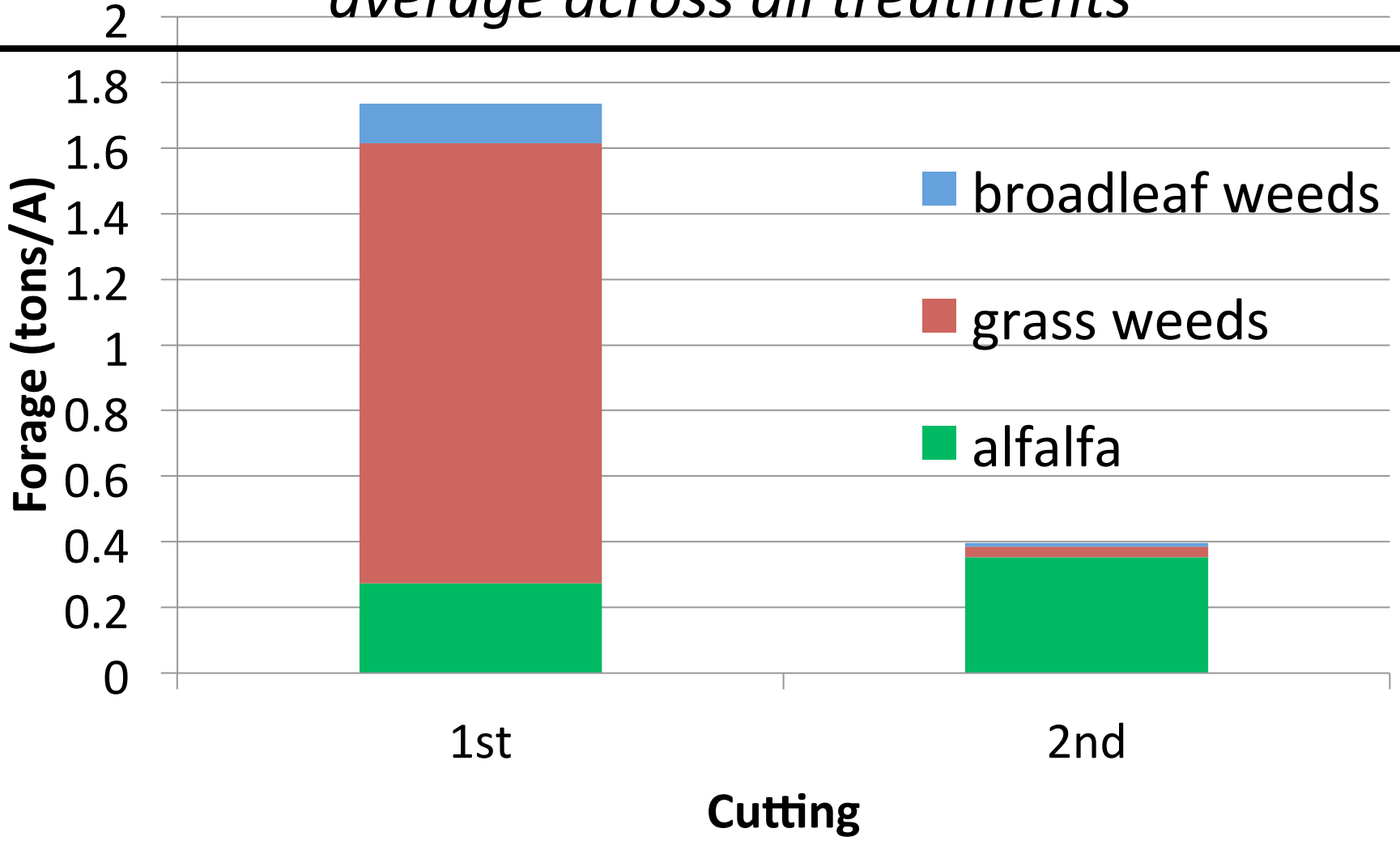
Broadleaf dominated across 6 locations



What happened in the 2nd cut?

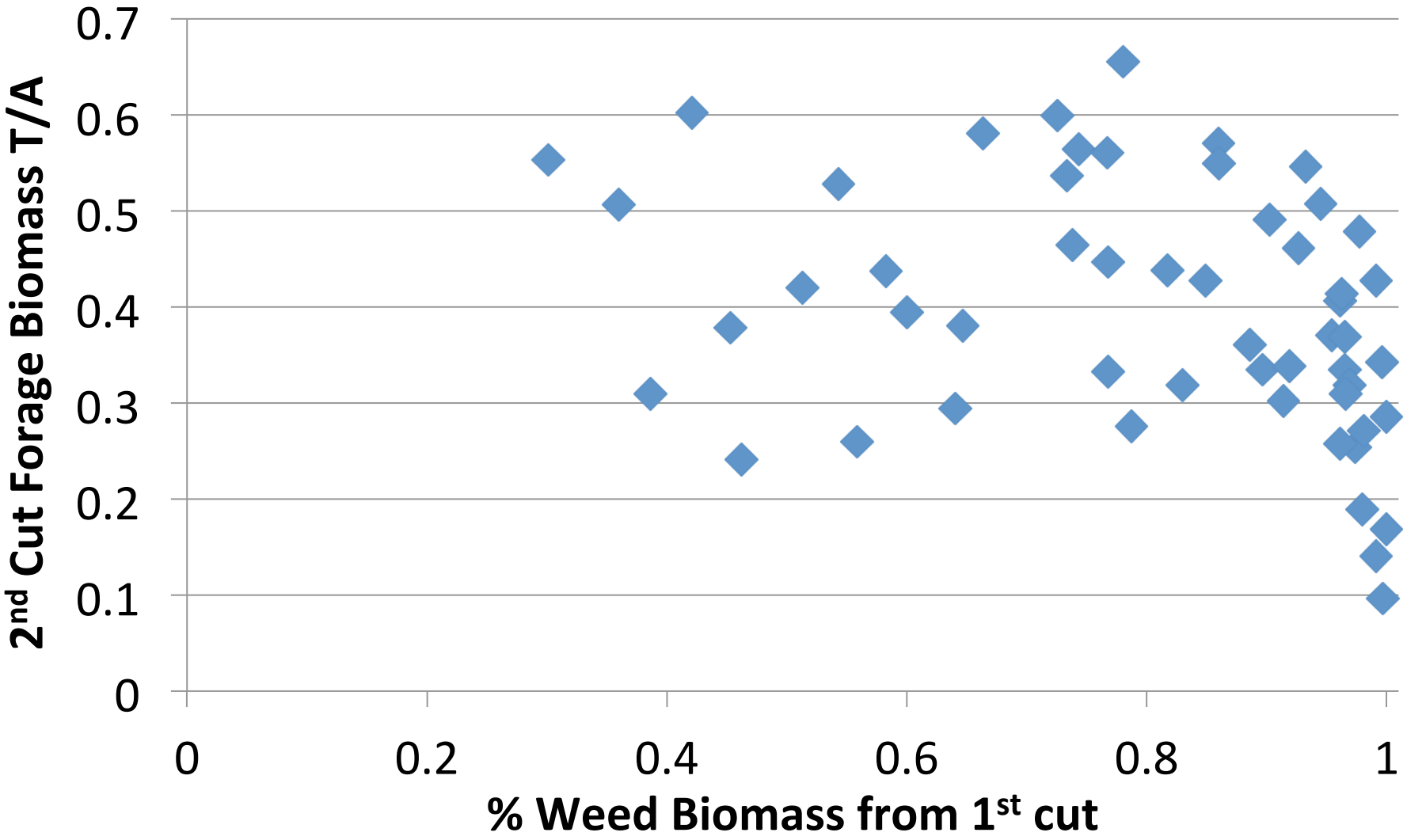
Yield in establishment year

average across all treatments



What happened in the 2nd cut?

Effect of initial weed population on yield



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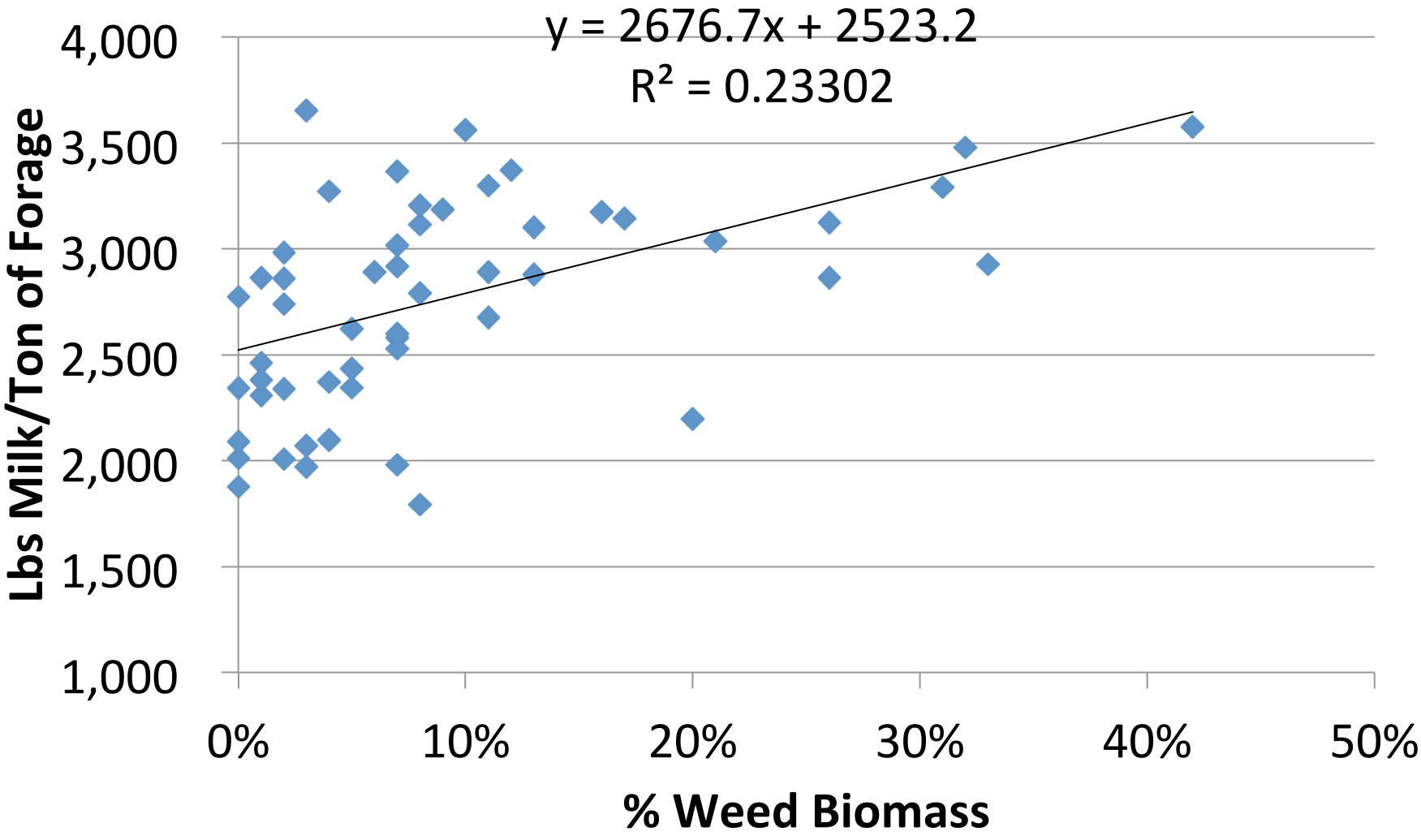

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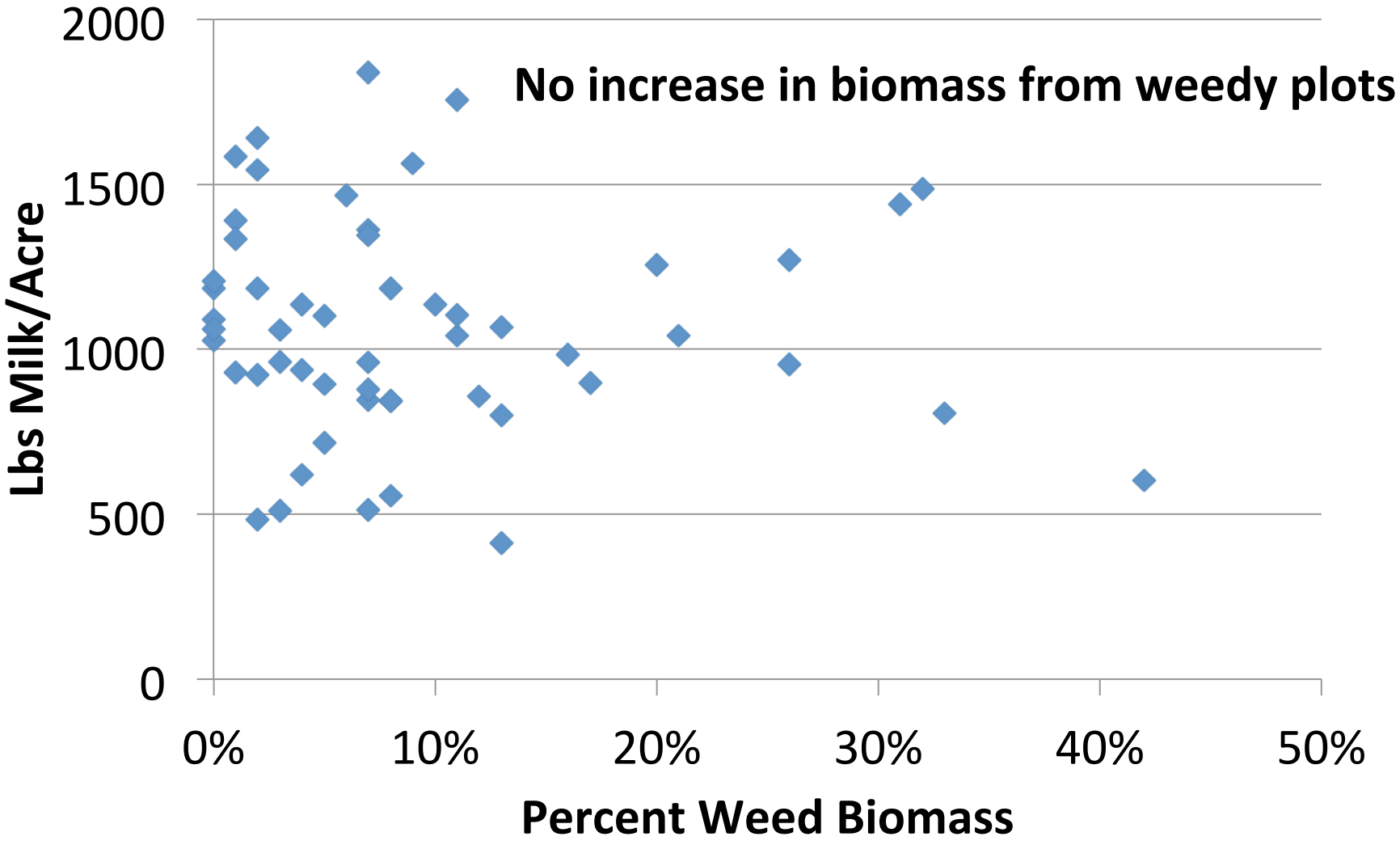
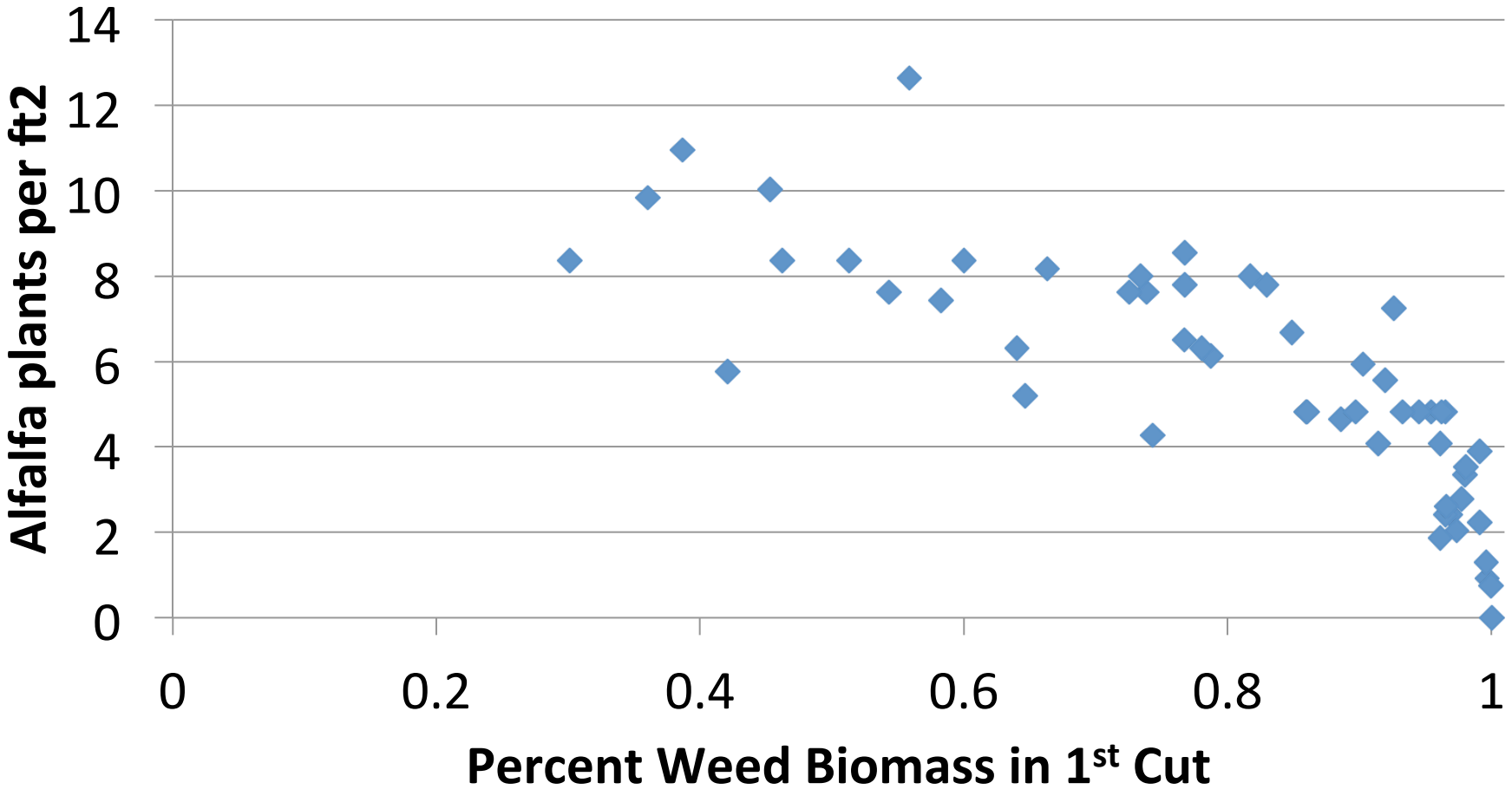


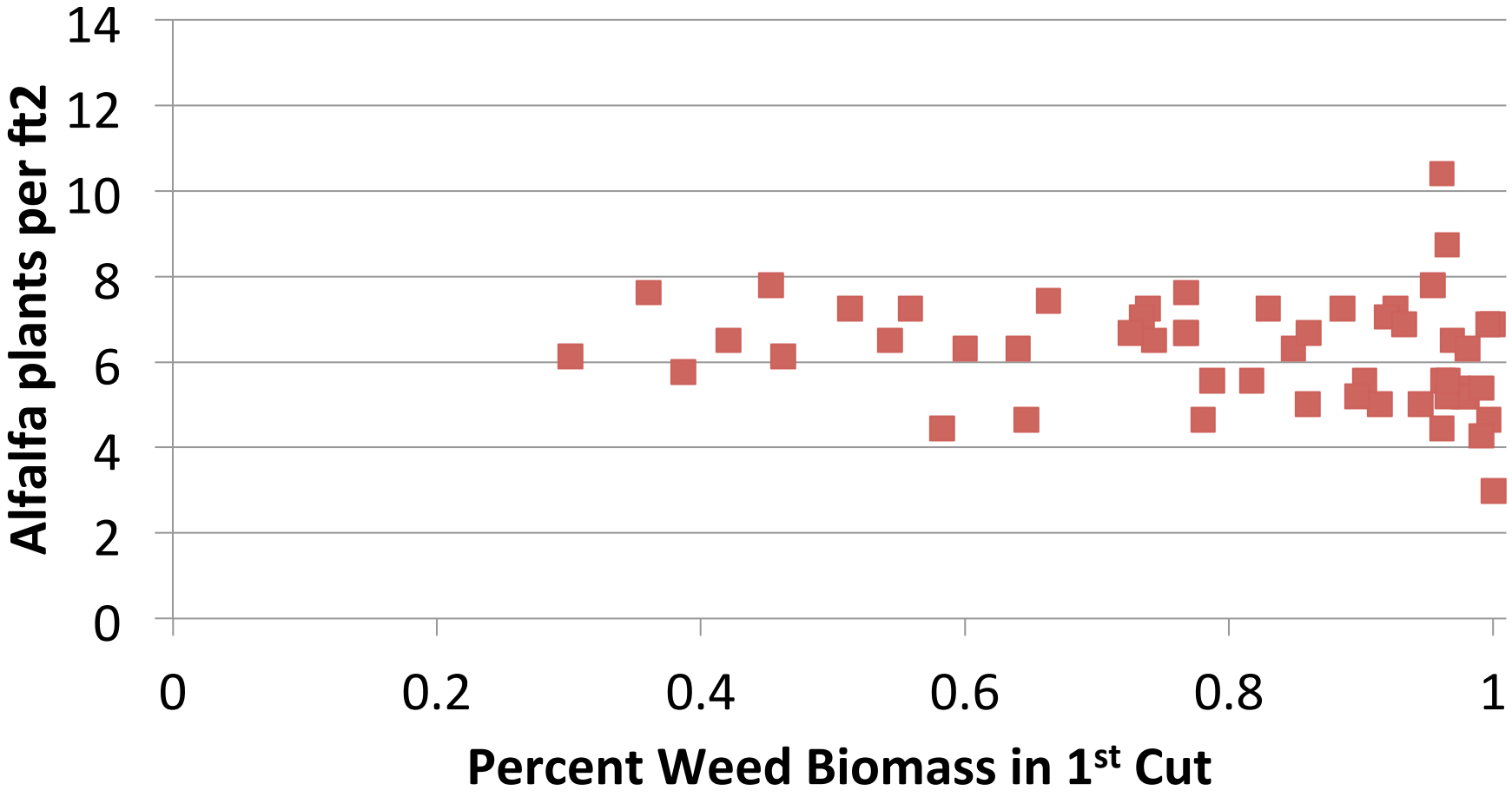
Weed populations reduce summer alfalfa plant density

August *Alfalfa Plant Counts*



No relationship between weed biomass and *Fall* alfalfa density

October alfalfa plant count



Will continue in 2015

- Return to exact location where previous data taken
  - Alfalfa stem and plant counts (April)
  - Cover of weeds and alfalfa (May)
  - Yield from first cut (May)
    - alfalfa, broadleaf weeds, grass weeds
  - Forage quality from 1st cut

Alfalfa Summary

When establishing alfalfa, weed populations……

1. Can increase yield of 1st cutting
   – 0 to 1.0 T/A
2. Can reduce forage quality, dependent on
   – Amount of weeds **(<30% ideal**)
   – Stage of development (**immature the best**)
3. Yield/forage quality from 2nd cutting is rarely reduced
4. Does not reduce alfalfa plant density

Summary on MILK production

- Milk per Ton of forage
  1. **If harvested timely** may not be reduced
     - Harvest before weeds start to product seed
  2. Low amounts of weeds (15-25%) may have a benefit

- Milk per Acre
  - Presence of weeds increased in 1st cut
    - Due to increased productivity
  - Similar in 2nd cut
    - No increase in biomass