



Introduction to Roundup Ready[®] Alfalfa

Technical Presentation

Roundup Ready Alfalfa is not approved for sale or distribution in the U.S. Roundup[®] brand herbicides are not registered for this use. It is a violation of Federal law to promote any unregistered herbicide use. Roundup Ready and Monsanto and the vine symbol are trademarks of Monsanto Technology LLC.





Notice on Technical Information

Portions of this presentation contain technical data about Roundup Ready® alfalfa. This data is provided solely for the purpose of informing the audience on the characteristics and available test data on the Roundup Ready system and on Roundup Ready alfalfa.

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Product Description

- Roundup Ready[®] alfalfa varieties contain in-plant tolerance to Roundup[®] agricultural herbicides
- Will enable growers to apply labeled Monsanto Roundup agricultural herbicides from planting up to 5 days before each cutting
 - Roundup WeatherMAX[®]
 - Roundup Original[®] MAX

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Roundup Ready Alfalfa

Performance, Flexibility & Simplicity

Research Trials have shown the following benefits:

- **Performance**

- Unsurpassed control of broadleaf and grass weeds
- Suppression/control of most persistent, parasitic or poisonous weeds

- **Flexibility**

- Broadest application timing window for both crop and weeds
- Excellent crop safety at all growth stages
- Minimal waiting (5 days) before grazing or harvest

- **Simplicity**

- No need to tank mix herbicides for broad spectrum weed control
- Works without soil incorporation
- No carryover or crop rotation restrictions

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Use of Roundup agricultural herbicides in Roundup Ready Alfalfa



Proposed Maximum Allowable Application Rates & Timing

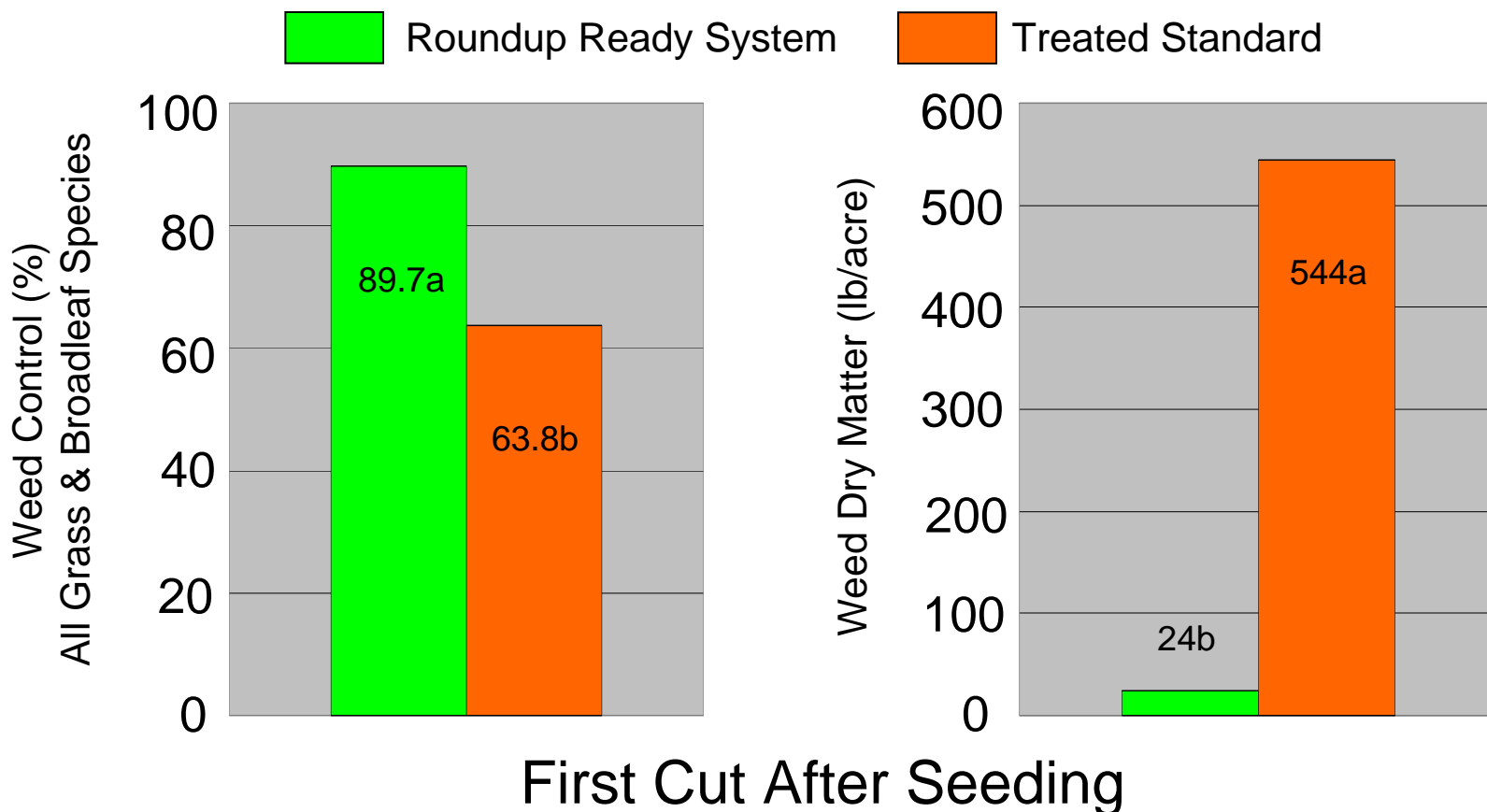
Application Timing	lbs ae/a	WeatherMAX (oz/acre)
Combined total per year for all applications	4.5	132
From preplant to preemergence	1.5	44
From emergence to 4 trifoliate leaves	1.5	44
From 5 trifoliate leaves to 5 days before first cutting	1.5	44
Total in-crop application per cutting after first cutting, applied up to 5 days before next cutting	1.5	44

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Weed Control in Roundup Ready® Alfalfa



Data Sources: 1,2,3,4,6

1,2,3,4,5,6

Data Source Experiment ID's

1: 2002103022, Monsanto; 2: AALF0203, Cornell; 3: 2003999A07, TAES;

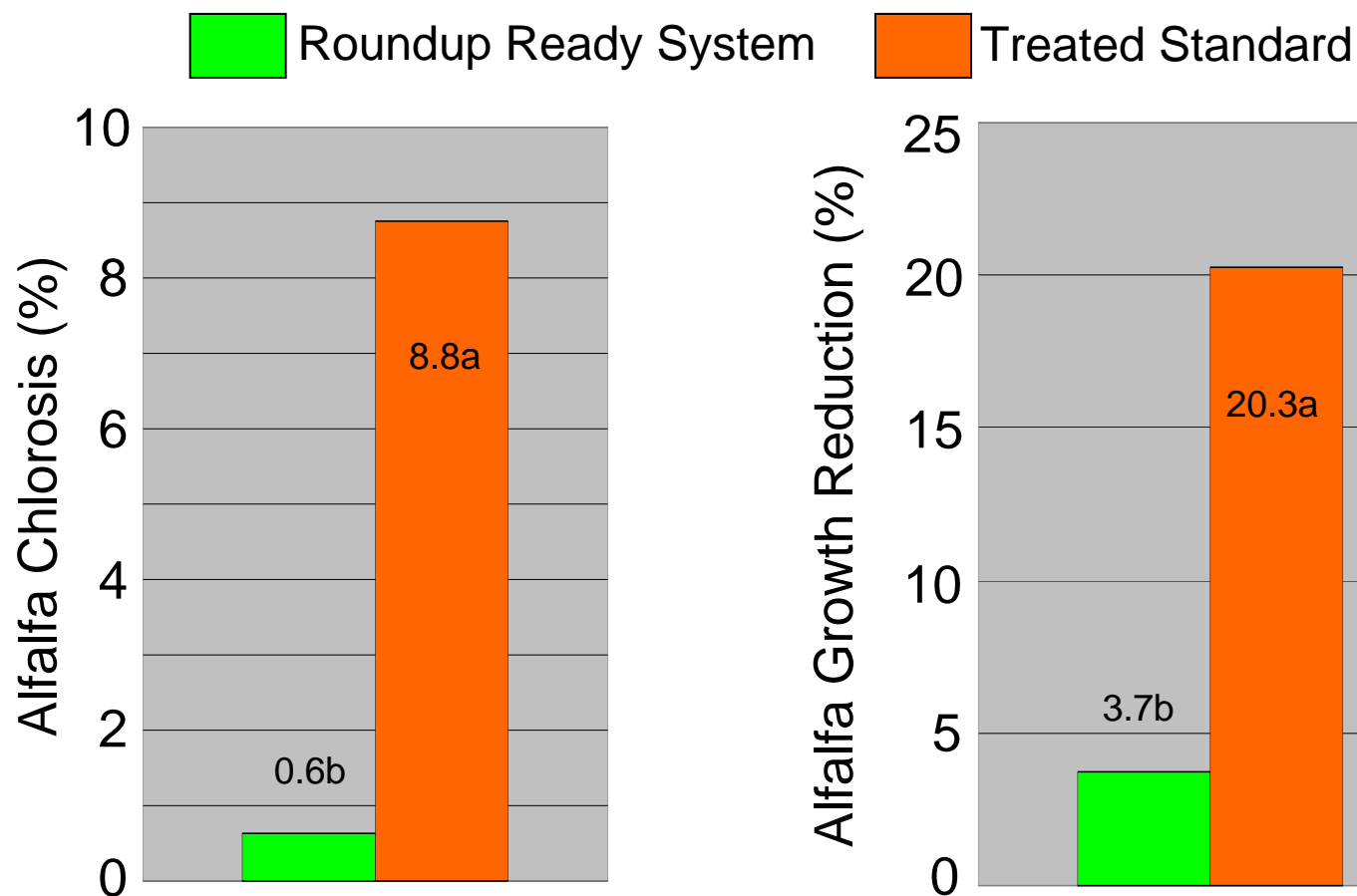
4: 2003599501, MSU; 5: B4-03 U of MN; 6: 2003723037, SDSU

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Crop Safety of Roundup Ready Alfalfa



First Cut After Seeding

Data Source Experiment ID's: 2003999A07, TAES; 2003599501, MSU

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Superior Crop Safety Compared to Conventional Herbicides

Roundup Ready System

Competitive Treatment



Both herbicide treatment programs were applied to Roundup Ready alfalfa.

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Improved Weed Control Improves Alfalfa Production



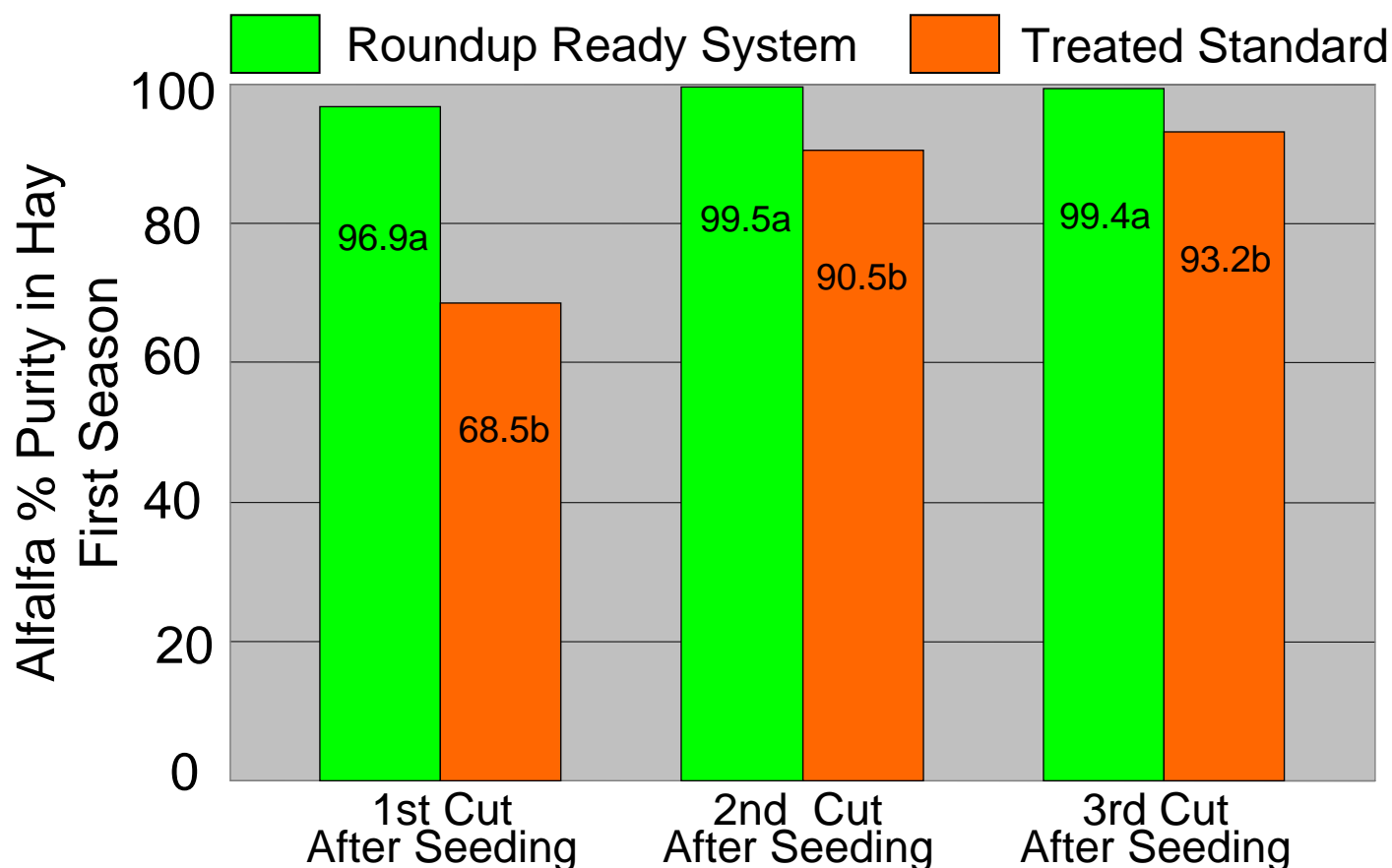
- Higher percent purity of alfalfa in hay and haylage
- More alfalfa yield per acre than competitive production systems
- Improved Quality:
 - Lower ADF (acid detergent fiber)
 - Lower NDF (neutral detergent fiber)
 - Higher RFV (relative feed value)

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Cleaner Hay - Higher Percent Alfalfa



Data Sources: 1,2,3,4,5,6

2,3,4

3,4

Data Source Experiment ID's

1: 2002103022, Monsanto; 2: AALF0203, Cornell; 3: 2003999A07, TAES;

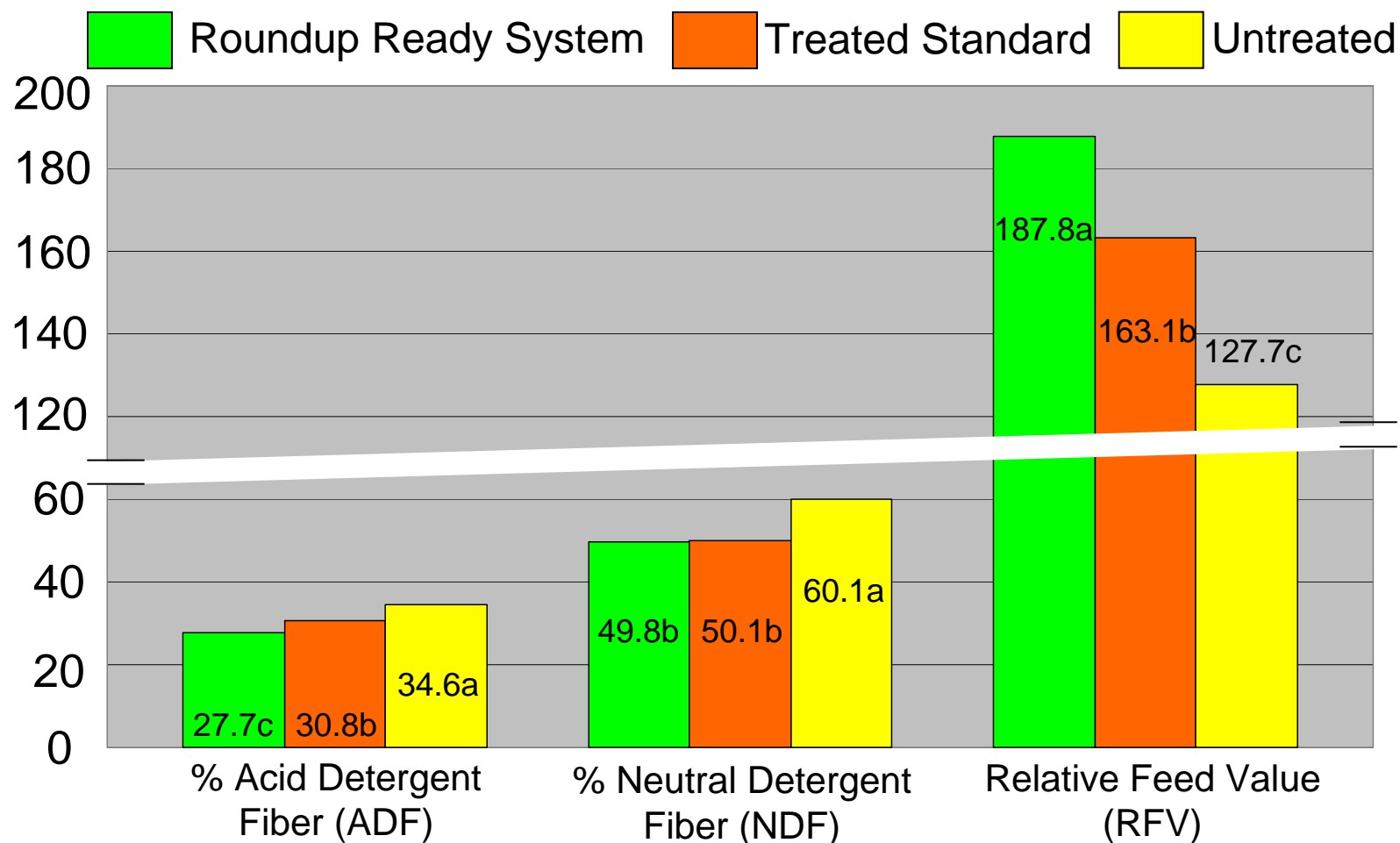
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Higher Quality Hay with Enhanced Weed Control



First Cut After Seeding

Data Source Experiment ID's: 2003999A07, TAES; 2003599501, MSU; B4-03 U of MN; 2003723037, SDSU

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Availability and Performance of Roundup Ready Alfalfa Varieties

- Anticipate USDA deregulation and commercialization sometime in 2005*
- Requirements for all Roundup Ready alfalfa varieties:
 - Pre-market testing/evaluation
 - Agronomic performance & crop safety evaluation
 - Roundup Ready trait purity
- Alfalfa breeding and trait integration
 - Variety developers
 - Current: Forage Genetics International (FGI)
 - Future: FGI and other breeding companies

*Commercialization is dependent on multiple factors, including successful conclusion of the regulatory process.

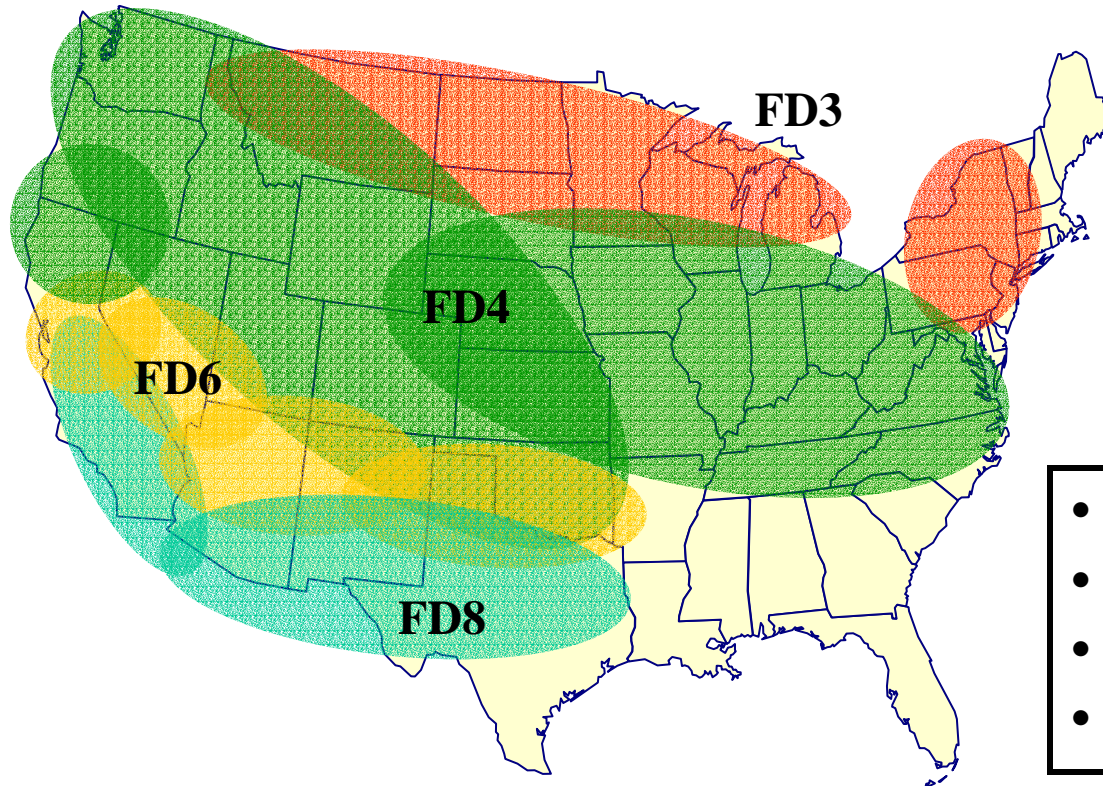
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Roundup Ready Alfalfa Varieties

Areas of adaptation for initial group of
Roundup Ready Alfalfa varieties



- Winterhardy FD3
- Winterhardy FD4
- Semi-dormant FD6
- Non-dormant FD8

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Variety Performance Testing

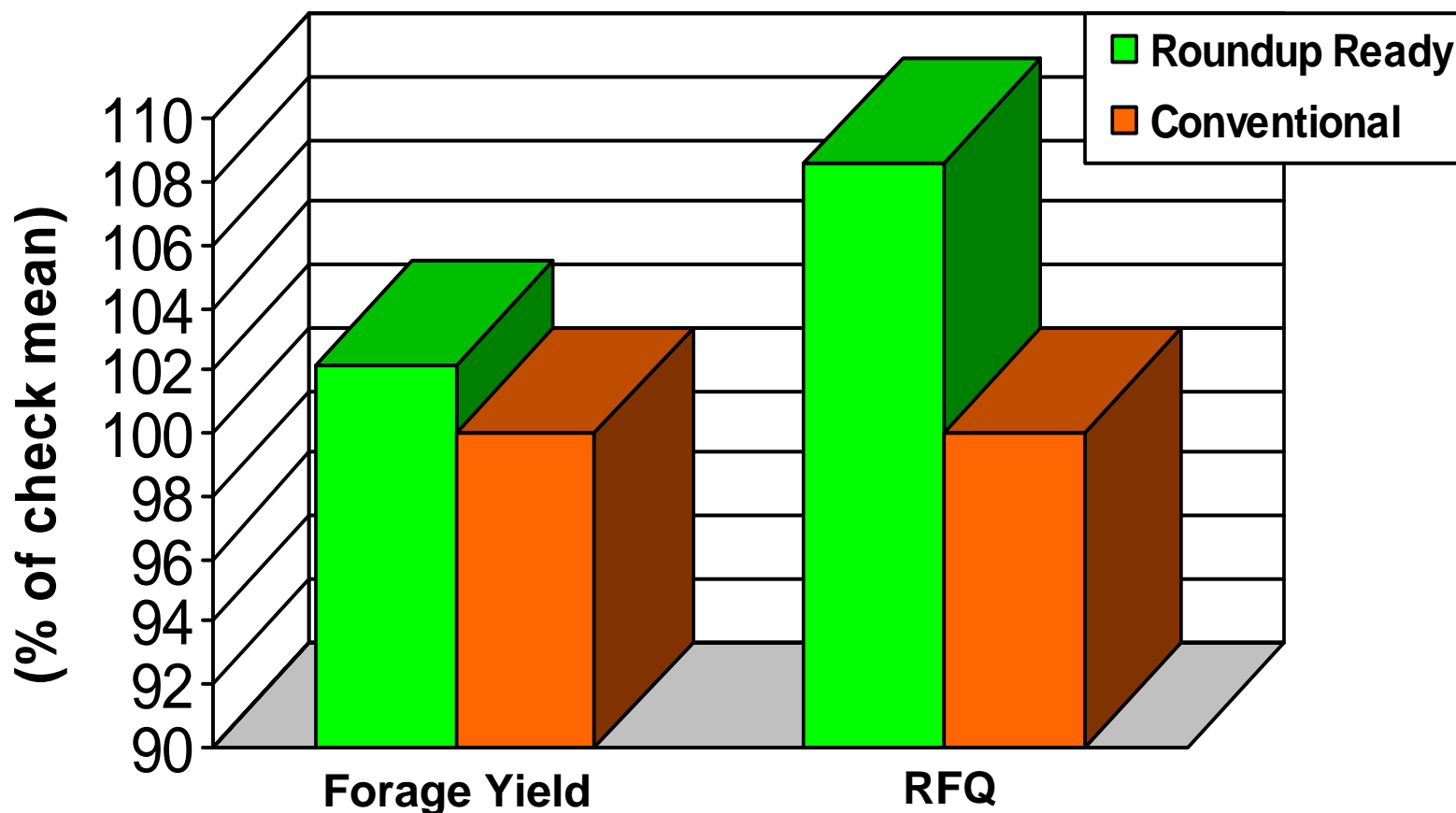
- Variety Performance trials were conducted by FGI on 15 dormant experimental Roundup Ready alfalfa varieties and 4 top performing commercial varieties at 7 locations in 2003/2004 season.

Wisconsin, Idaho, Indiana, Iowa, Nebraska, Pennsylvania & Washington

- All trials were seeded in fall 2003.
- All varieties received the same conventional herbicide treatment program.
- Trials were harvested 4 or 5 times in 2004.
- Relative Feed Quality was measured at 3 locations for each harvest.



Roundup Ready Alfalfa Variety Performance Trials



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Summary

- Performance
 - Unsurpassed control of broadleaf and grass weeds
 - Suppression/control of most persistent, parasitic or poisonous weeds
 - New Roundup Ready alfalfa varieties meet strict performance standards for yield and forage quality
- Flexibility
 - Broadest application timing window for both crop and weeds
 - Excellent crop safety at all growth stages
 - Minimal waiting (5 days) before grazing or feeding
- Simplicity
 - Works without soil incorporation
 - No need to tank-mix for broad spectrum weed control
 - No carryover or crop rotation restrictions



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