# Seed Coatings in Alfalfa Seed Production

# Bing-Rui Ni United AgTechnologies



# **Types of Seeds Planted**

- Raw No Treatment
- Preinoculated Apron + Inoculant + Color
- Film Coated Apron + inoculant + Polymer with Color
- Coated Apron + Inoculant + a Thin Layer of Coatings with Color
- Pelleted Apron + Inoculant + a Thick Layer of Coatings



# **Types of Seed Coatings**

- Coating, Film Coating, and Pelleting are all collectively called seed coating
- Film Coating Using Polymers to adhere active ingredients to the seeds, no addition of inert materials, 1 10% weight gain
- Coating Addition of inert materials. 10 50% weight gain
- Pelleting Inert materials are added to make the seeds nearly round or round



## **Raw, Coated, and Pelleted Seeds**





## Raw>Pelleted>Coated>Film Coated









# **Rotor/Stator Pelleting Machine**









# Plant Population and Alfalfa Seed Yield



#### Plant Population and Seed Yields (24 Inch Row, Glenlea, Manitoba – 1971)





#### First Year Yield of WL 605, Spring Seeding

(Redraw from Dr. Shannon Mueller's Paper, UC Davis)



**Spacing Treatment** 



# First Year Yield of CUF 101, Fall Seeding

(Redraw from Dr. Shannon Mueller's Paper, UC Davis)



**Spacing Treatment** 





**Row Spacing** 

United AgTechnologies



## Thinner Stands, High Seed Yield (CA)

- Fresno, CA
- Seeded Nov, 15, 2014
- MMPill 10, 30" Bed, 4"
  Drop, 52,000 pellets (0.3 Ibs live seeds) per Acre
- Over 1,000 lbs per acre



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## How Does Pelleted Seeds Help Alfalfa Seed Production



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- The Pelleting Materials Assure Perfect Seed-Soil Contact, Improving Seed Moisture Uptake and Quick germination
- Faster Root Growth to Reach the Wetter Soil Layer Preventtiing the germinated seeds from Drying out in a Sandy Soil in a Windy Spring



# Quick Moisture Uptake and Size Increase with the Assistance of a Super Hydrating Polymer

#### I Minute after Sowing





# Quick Moisture Uptake and Size Increase with the Assistance of a Super Hydrating Polymer

#### **30 Minute after Sowing**





#### **Quick Moisture Uptake and Germination with** the Assistance of a Super Hydrating Polymer

#### 42 Hours after Sowing





#### **Quick Moisture Uptake and Germination with** the Assistance of a Super Hydrating Polymer

## **3 Days after Sowing**





#### Quick Moisture Uptake and Root Growth with the Assistance of a Super Hydrating Polymer

#### **5 Days after Sowing**





#### **MMPill Enhances Seed Germination (3d)**



#### **MMPill** Enhances Seed Germination (4d)



#### **MMPill** Enhances Seed Germination (5d)

![](_page_26_Picture_1.jpeg)

#### **MMPill Enhances Seed Germination (3d)**

![](_page_27_Picture_1.jpeg)

#### MMPill 10 Pelleted Alfalfa Seeds A Few Minutes After Sowing

![](_page_28_Picture_1.jpeg)

# How Does Pelleted Seeds Help Alfalfa Seed Production

- The Coating Materials Assure Perfect Seed-Soil Contact, Improving Seed Moisture Uptake and Quick germination
- Faster Root Growth to Reach the Wetter Soil Layer Preventing the Germinated Seeds from Drying out in a Sandy Soil in a Windy Spring
- Seed production requires large, fully developed, strong individual plants. Precision and Space Seeding Resulted in a Thinner Stand with Uniform Plant Distribution; Reducing Competition for Water and Nutrients,.

![](_page_29_Picture_4.jpeg)

# Seeding Rate and Seed Space (22" Bed)

Seeding Rate	Seeds/A	Distance between Seeds (inch)
3.0 #/A	675,000	0.42 (>3/8)
1.5 #/A	337,500	0.84 (<7/8)
0.5 #/A	112,500	2.53
5 oz/A	71280	4
3.4 oz/A	47,520	6

![](_page_30_Picture_2.jpeg)

### Alfalfa Seed Fields After Emergence (Wyoming)

![](_page_31_Picture_1.jpeg)

#### 2" Drop

4" Drop

![](_page_31_Picture_4.jpeg)

#### Alfalfa Seed Fields 2 Weeks after Seeding (WY)

![](_page_32_Picture_1.jpeg)

![](_page_32_Picture_2.jpeg)

#### Alfalfa Seed Fields 12 Weeks after Seeding (WY)

![](_page_33_Picture_1.jpeg)

![](_page_33_Picture_2.jpeg)

#### A Close View of the Alfalfa Seed Field with 4" Drop

![](_page_34_Picture_1.jpeg)

# How Does Pelleted Seeds Help Alfalfa Seed Production

- The Coating Materials Assure Perfect Seed-Soil Contact, Improving Seed Moisture Uptake;
- Quick germination, Faster Root Growth to Reach the Wetter Soil – Prevent from Drying out in a Sandy Soil in a Windy Spring
- Seed production requires large, fully developed, strong individual plants. Precision and Space Seeding Resulted in a Thinner Stand with Uniform Plant Distribution; Reducing Competition for Water and Nutrients
- Better branching, Open Canopy, Less Shading, More Efficient Use of Sun Light, Easy Access for Bee Pollination and Insecticide Application

![](_page_35_Picture_5.jpeg)

#### Alfalfa Seed Fields at the Beginning of Flowering (WY)

![](_page_36_Picture_1.jpeg)

![](_page_36_Picture_2.jpeg)

#### Thinner Plants resulted in Higher Seed Yield (WY)

- Alfalfa plants from the 4" dropped field
- The yield was 200 pounds more than the field seeded with 2" drop

![](_page_37_Picture_3.jpeg)

![](_page_37_Picture_4.jpeg)

# How Does Pelleted Seeds Help in Alfalfa Seed Production

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- Better branching, Open Canopy, Less Shading, More Efficient Use of Sun Light, Easy Access for the Bee Pollination and Insecticide Application
- Strong, Deep and Extensive Root Systems for Moisture and Nutrient Uptake and Prevent Plants from Falling Down.

![](_page_38_Picture_6.jpeg)

#### **Difference in Plant and Root Sizes – MMPill 6 Pellets**

![](_page_39_Picture_1.jpeg)

1.0 lb/A 1.5 lbs/A 2.0 lbs/A

#### Alfalfa Seed Fields

#### PELLETED

![](_page_40_Picture_2.jpeg)

![](_page_40_Picture_3.jpeg)

![](_page_40_Picture_4.jpeg)

#### Raw Seeds Seeded Fields - Close View

![](_page_41_Picture_1.jpeg)

![](_page_41_Picture_2.jpeg)

#### **Big Difference in Plant Roots**

#### RAW PELLETED

![](_page_42_Picture_2.jpeg)

![](_page_42_Picture_3.jpeg)

# A Good Pellet

- It should be particularly developed for alfalfa seeds which should include a combination of macro- and micronutrients, fungicide seed treatments, and *Rhizobia* inoculants.
- It should be able to improve seed water uptake and enhance seed germination and field emergence.
- It should be very hard when it is dry which makes sure it does not break during seeding
- It should opens up very fast when wetted so there is no delaying in seed germination

![](_page_43_Picture_5.jpeg)

#### Comparison of MMPill Pellets with Seeds Pelleted by a Vegetable Seed Pelletingg Company (1.5 Days)

![](_page_44_Picture_1.jpeg)

![](_page_44_Picture_2.jpeg)

#### Comparison of MMPill Pellets with Seeds Pelleted by a Vegetable Seed Pelletingg Company (2 Days)

![](_page_45_Picture_1.jpeg)

![](_page_45_Picture_2.jpeg)

#### Comparison of MMPill Pellets with Seeds Pelleted by a Vegetable Seed Pelletingg Company (3 Days)

![](_page_46_Picture_1.jpeg)

![](_page_46_Picture_2.jpeg)

# **Increasing Use of Pelleted Seed**

- MMPill Pelleted: From 144 lbs (2004) to 12,340 lbs (2015)
- Covers 9 States: CA, ID, OR, WA, NV, MT, UT, WY, CO
- Available in Both MMPill 6 (Small, 2 2.75 mm) and MMPill 10 (Large, 3.0 – 3.5 mm) Sizes. No Special Planter is Required

![](_page_47_Picture_4.jpeg)