Grass Seed Production

History
• Seed from the pastures and hay fields of European immigrants
• Grass seed did not become an important agricultural crop until after the destructive 1930's Dust Bowl
• Important agricultural crop primarily in the Pacific Northwest followed by Minnesota and other north central states

Uses
• Forage grasses
  – Pasture and hay for the livestock industry
  – Help prevent soil erosion on land which is unsuited for row crops
  – Provide wildlife habitat
  – Contribute to land reclamation

• Turf grasses
  – Landscape surface in the urban and suburban environment.
  – Home lawns
  – Golf courses
  – Athletic fields

Environment Requirements
• Climate
  – Adapted to North central, Midwest, Northwest climates
• Soil
  – Easily worked, well drained
    • Sandy loam, loam or silt loam soil.
  – Production of Kentucky bluegrass seed has been successful on organic soils.

Oregon Grass Seed
• Produces 60 percent of the world's cool season grass seed is produced.
• #1 in the nation in the production of orchardgrass, ryegrass and fescue seed.
• #2 in the nation for the production of Kentucky bluegrass seed.
Oregon Grass Seed

- Nearly all grass seed produced in Oregon is sold outside the state.
- Grass seed is exported to every state in the U.S. and over 60 countries around the world.

Oregon Grass Seed Production

- Ideal climate conditions
  - Mild, wet winters and warm, dry summers
  - Spring and fall rains are important to proper plant vigor and development.
  - Winter cold enough for vernalization
  - Adequate sun in summer dries windrows and ripens seed heads before thrashing

Oregon Grass Seed Production

- Willamette Valley
  - 95 percent of the grass seed grown in Oregon
  - 50 percent of the tillable land (500,000 acres) is planted to grass seed.

Oregon Grass Seed

- Changes from 1999 to 2000
  - Acres Grown increased 1.8 percent in acres grown
  - Total value of grass seed crops declined by 6.5 percent

Oregon Grass Seed

- Decrease in acreage
  - Perennial ryegrass (-3.1 percent)
  - Annual ryegrass (-0.5 percent)
  - Orchardgrass (-3.8 percent)
  - Colonial bentgrass (-5.8 percent)
Oregon Grass Seed

- Increased in acreage:
  - Hard fescue (98.5 percent)
  - Red fescue (27.2 percent)
  - Kentucky bluegrass (20.4 percent)
  - Chewings fescue (9.5 percent)
  - Tall fescue (5.0 percent)
  - Rugh bluegrass (3.6 percent)
  - Creeping bentgrass (2.7 percent).

Field Production

Seedbed Preparation

- Firm, well packed seedbed on a level, moderately well-drained soil
  - Small seeds
- Potential for soil erosion
  - Initial seedling growth is often slow

Weed Control

- Difficult to achieve
- Necessary for certified seed
- Problem weeds
  - Annual and perennial grasses
  - Perennial broadleaves

Planting

- Spring or Fall
- Planted on clean fields
  - No dormant volunteer seed
  - No weeds
- Some fields are planted using the charcoal banding process

Planting

- Shallow seeding depth, from 1/4 to 3/4 in. deep
- Planting equipment with double disc openers, depth bands and packer wheels
  - 4.5 to 6 lbs per acre for perennial ryegrass
  - 1 to 3 lbs per acre for Kentucky bluegrass
Nutrient Management

• 80 percent of seed and straw production occurs between April and early June

Nutrient Management

• Peak uptake for most nutrients occurs in April
  – Very little uptake of nutrients occurs in May and June

Nutrient Management

• Nitrogen
  – Uptake precedes rapid tiller elongation and crop growth
  • Rapid Uptake during April and essentially complete by mid-May
  • Uptake typically ranges from 120 to 190 lb/a
  • Soil mineralization is usually adequate to meet plant needs during fall and winter
  – Fertilizer N application
  • From 50 to 80 lb/a for fine fescue to 140 to 160 lb/a for perennial ryegrass.

Nutrient Management

• Phosphorus
  – High clay and organic matter content soils adsorb P tightly in the surface layer of the soil
  – Use of soil analysis to determine P fertilizer needs

• Potassium
  – Grass seed plants remove large amounts of K from the soil
  – Very little K is removed with the seed at harvest
  – K in the straw is rapidly recycled and available to plants

Nutrient Management

• Other nutrients
  – Sulfur, calcium and magnesium are commonly applied to grass seed crops
  – Periodic Boron applications (not annually)

• Soil acidity
  – Under grass seed soils consume the equivalent of 500 or more lb/a of lime yearly
  – Good root growth is only obtained at pH levels above 5
Disease Management

• Leaf spot diseases
  – Most active during cool, wet conditions
  – Purple eye spot in Orchardgrass

• Rust
  – Most serious disease threat to grass seed production in the Willamette Valley
    • Tall Fescue and Perennial Ryegrass most susceptible

Slug control

• Slugs
  – Increasing problem in western Oregon grass seed fields
    • Reduction of open field burning and soil tillage
  – Most effective way to control slugs is through cultivation

Vole Control

• Cultural control
  – Encouraging predator habitat
    • Hawks

• Chemical control
  – Oregon 24(c) Special Local Needs labels for broadcast application of zinc phosphide oat bait and pellets

Disease Management

– First-year stands generally are more heavily rusted than established stands.
  • Yield reductions do not occur unless rust levels exceed approximately 2 percent by the last week before harvest

Harvesting

• Time of harvest
  – Grasses generally do not mature uniformly
    • Seed ripening begins at the panicle tip and moves downward
  – Stage of harvest is at the medium to hard dough stage
  – Need for a compromise between maturity and shattering losses
Harvesting

- **Three Methods**
  - Direct combining, swathing and combining, and seed stripping

- **Swathing and combining most common**
  - Advantages
    - Faster combining of the field-cured foliage
    - Earlier harvesting because seed cures in the windrow
    - Less seed loss through shattering
    - Harvested seed is usually dry and safe to store directly

- **Disadvantages**
  - Rains may delay combining causing substantial shattering and potentially lowering seed quality
  - More weed seed contamination will be in the grass seed.
  - Equipment
    - Standard grain combine

Residue Management

- **Three approaches**
  - Thermal
  - Clean nonthermal
  - Full straw load

Thermal

- **Fire-based residue removal and stubble management systems.**
  - Full straw load + Open field burn
  - Full straw load + Open field burn + propane burn
  - Bale + Open field burn
  - Bale + Propane burner

- **Disease control**
  - Diseases of the seed but not foliar diseases.

- **Weed control**
  - Fire destroys volunteer crop seed, weed seed and weed plants.

- **Seed yield increase**
  - Creeping red fescue, not observed in other species

- **Nutrient recycling**
  - Potassium and phosphorus, but not nitrogen.
Clean Nonthermal

- Primary straw removal by baling,
- Various methods of secondary removal to achieve a clean field.
- Stubble management may or may not be employed

Full Straw Load

- No straw removal, straw composites in place on field.
- Stubble height is reduced by flail mower.

Clean Nonthermal

- Development of an off-farm straw removal and handling industry
  - 500,000 tons of Oregon grass seed straw exported primarily for use in Japan and Korea
- Works well for bunch-type growth habit
  - Tall fescue, orchardgrass, perennial ryegrass
- More difficult in species with a creeping-type growth habit
  - Kentucky bluegrass, bentgrass

Full Straw Load

- Forego baling when straw might not meet quality standards.
- Nutrient retained
- Mulch to aid in the suppression of troublesome weeds
- Difficult practice
  - Species and variety response differences
  - Successful with orchard grass followed by tall fescue and perennial ryegrass
Drying and Storage

- Removal of damaged seed, contaminants, and other field trash
- Specialized equipment is necessary

Storage

- Seed is stored in approved warehouses
- Lots to be certified are cleaned and tested

Certification

- Assurance that the variety name specified is grown to standards set forth by the plant breeder
- Inspection of seed-producing fields and seed lots to ensure genetic purity of seed

Four seed classes

- **Breeder Seed**
  - Original source of all classes of certified seed.
- **Foundation Seed**
  - (White tag) is produced from fields planted with Breeder seed
- **Registered Seed**
  - (Purple tag) is produced from fields planted with Foundation seed.

Certification

- **Certified Seed**
  - (Blue tag) is produced from fields planted with Registered seed
  - Or from Foundation seed if there is no Registered class.
  - Certified seed available to the consumer

Seed Certification

- Steps 1-5 to produce certified seeds:
  - Obtain foundation or registered seed
  - Clean all equipment before planting, harvesting, transporting or storing the seed
  - Plant the seed on clean ground that meets all certification land requirements.
  - Apply and submit forms
  - Prepare your seed fields for inspection by controlling weeds.
Seed Certification

• Steps 5-9 to produce certified seeds:
  – Arrange for field inspection
  – Harvest, transport and store the seed with clean equipment.
  – Have the seed conditioned (cleaned) by an approved certified seed conditioner
  – Submit a representative sample of the conditioned seed to the Certification agency for purity and germination analysis