

# Urea Ammonium Nitrate (UAN)

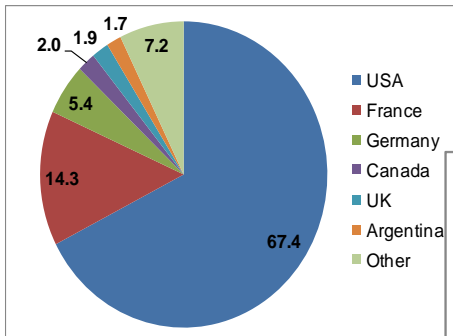
Ray Dowbenko, Agrium



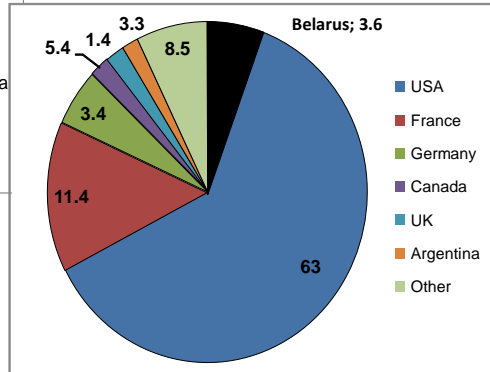
Adrian Johnston, IPNI



## World distribution of N solution consumption



4.3 million tonnes  
2004 - 2006



5.1 million tonnes  
2011

## Urea-Ammonium Nitrate Solutions

1. 28 % nitrogen (also 32-0-0)
2. Liquid
3. N forms: urea (14%) and ammonium (7%) and nitrate (7%)



## 28-0-0 & 32-0-0

- 32-0-0 used in warmer climates (salt out @ 0C)
- 28% nitrogen solution (salt out @ -18C)
  - 50% Urea
  - 25% Ammonium
  - 25% Nitrate
- Only N fertilizer to contain these three forms of nitrogen in one product.

## Urea-Ammonium Nitrate Solutions Manufacture

1. Ammonia + urea + ammonium nitrate + water + nitric acid
2. Urea + ammonium nitrate + water  
Most common process, can use liquid or solid forms of urea and ammonium nitrate
3. Urea + nitric acid + ammonia

## 28-0-0

- 0.36 kg of Nitrogen per litre
- 1.2 kg/ per litre of 28-0-0
- 781.3 litre per tonne
- Salt-out temperature of  $-18^{\circ}\text{C}$
- Specific gravity is 1.275 @  $15.5^{\circ}\text{C}$

## Liquid Fertilizers

- Liquid fertilizers are completely blend compatible
- Each droplet is a homogeneous mix of nutrient
- Even application
- Excellent carrier for micronutrients
- Liquid fertilizers contain the same nutrients that are found in other fertilizers

## Placement Options

- Banded in soil
- Banded on the surface
- Sprayed on soil surface
- Split applications for foliar topdress
- Fertigation or injection into irrigation systems
- Potential to mix with herbicide and foliar apply

## Applying Liquids at Seeding



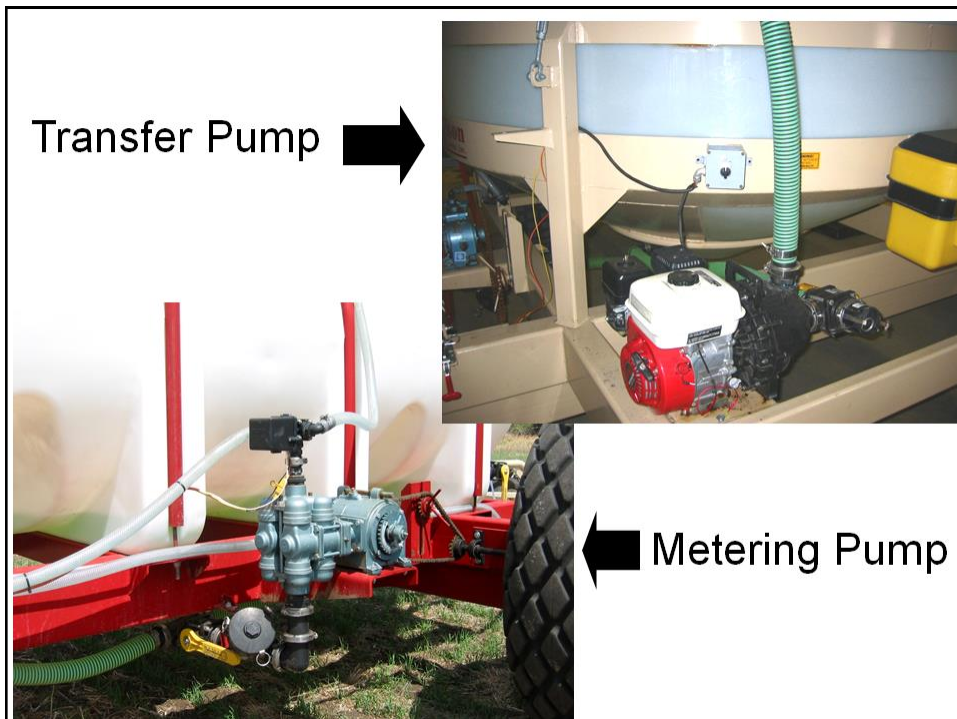
## Application Accuracy

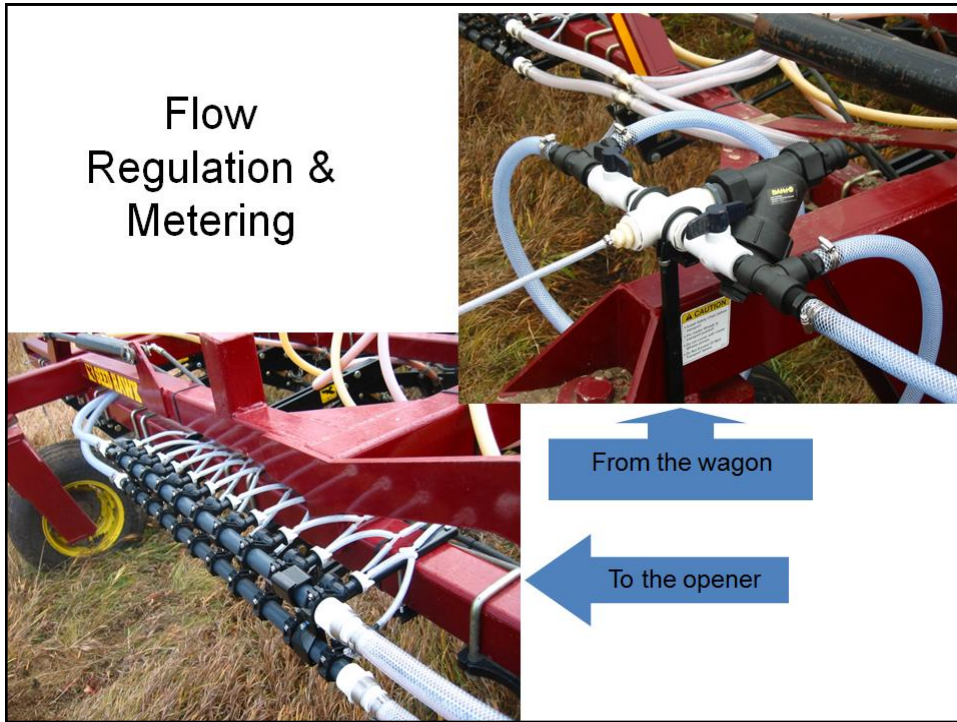
- Liquid application technology is simple, accurate, easily metered, and monitored
- Suitable for “low labour” operations
- Fit with drip irrigation/fertigation



## Ease of Handling

- Liquids are stored and pumped in non-pressurized containers
- Poor weather, i.e.. rain, does not cause problems
- Ease of transfer
  - one person operation is feasible
  - flexible hose, no accurate backing up of the nurse tank or truck





### Machinery Developed for Large Farms

- Large capacity wagons allow more acres per fill
- Prescription blends for each field are easily achieved



## Applying Liquids Pre- or Post-Emergence

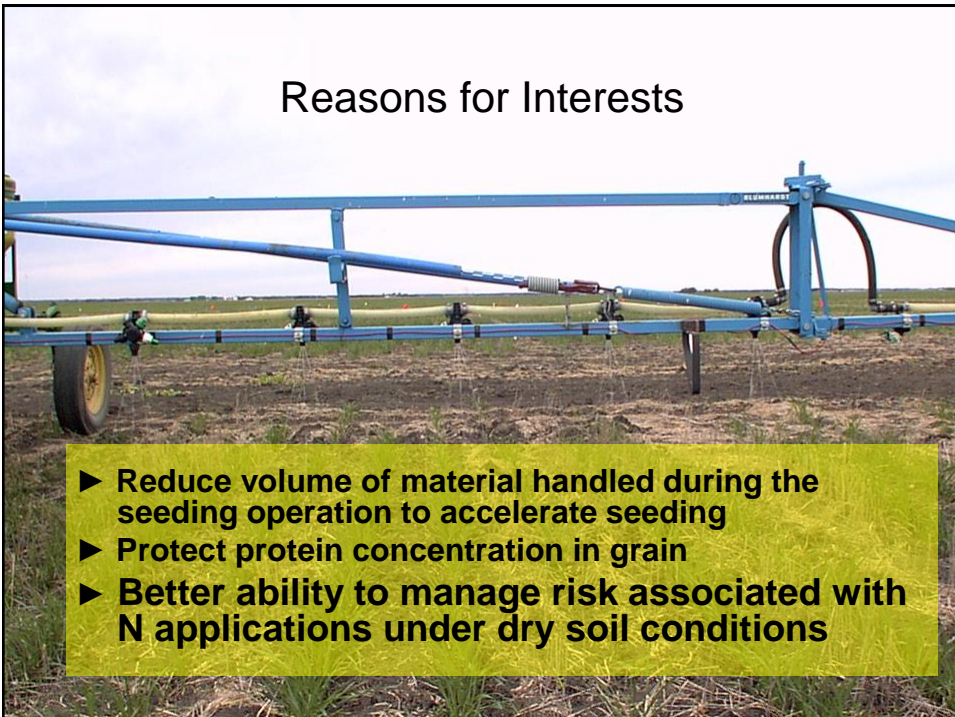
Surface dribble band



In soil coultter application



## Reasons for Interests



- ▶ Reduce volume of material handled during the seeding operation to accelerate seeding
- ▶ Protect protein concentration in grain
- ▶ Better ability to manage risk associated with N applications under dry soil conditions



## Nitrogen Agronomy

- Split Applied UAN Management and/or Environment
- Reduced moisture at seeding
- Post-seeding “high” rainfall yield and/or protein
- Higher cost involved...Risk management

### On-farm and in field storage units



## Safe Handling

- Not stored under pressure
- No dust created while handling
- Closed storage and distribution, so minimal operator exposure
- Most forms are low in corrosivity and low toxicity
- Can be easily washed off with water if contact with skin occurs

## Disadvantages

- Lower nutrient analysis...  
higher cost per lb of nutrient
- Storage space...large volumes
- Hard to pick-up a spill
- Freezing/salting out (cold temperatures)
- Require containment system (in case of storage tank failure)

## Liquid and Dry or Ammonia Fertilizers

- Many of the liquid advantages are dry advantages as well
- Many of the options with liquids, are options with dry fertilizer and ammonia as well
- Do not “stretch” the science
- Choose what you are comfortable with, and what fits into your operation

## Liquid and Dry or Ammonia Fertilizers

- Agronomically – the same
- Under proper agronomic consideration, all forms pretty much the same
- Plants cannot tell the difference in nutrients
- Controlled research shows little to no difference between fertilizer sources

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