

# Hays and Haying

Equine Nutrition #12  
Created for Canadian Pony Club  
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**Forages**

- Forages are the largest constituent of the diet
- Forages include:
  - **Grass**
    - High moisture content
    - Lower lignin content
  - **Hay**: dried/preserved mature grass
    - 15% moisture content
    - Higher lignin content
  - **Haylage**
  - **Silage**
- Two main **types** of hay:
  - **Seed/grass hay**
  - **Legumes**

# Forages

- The chemical composition of forage varies widely:
  - Protein 6-30%\*\*
  - Fibre 20-40%
  - Water soluble carbohydrates 3-40%
    - Varies depending upon many different factors
  - Lipids 3%

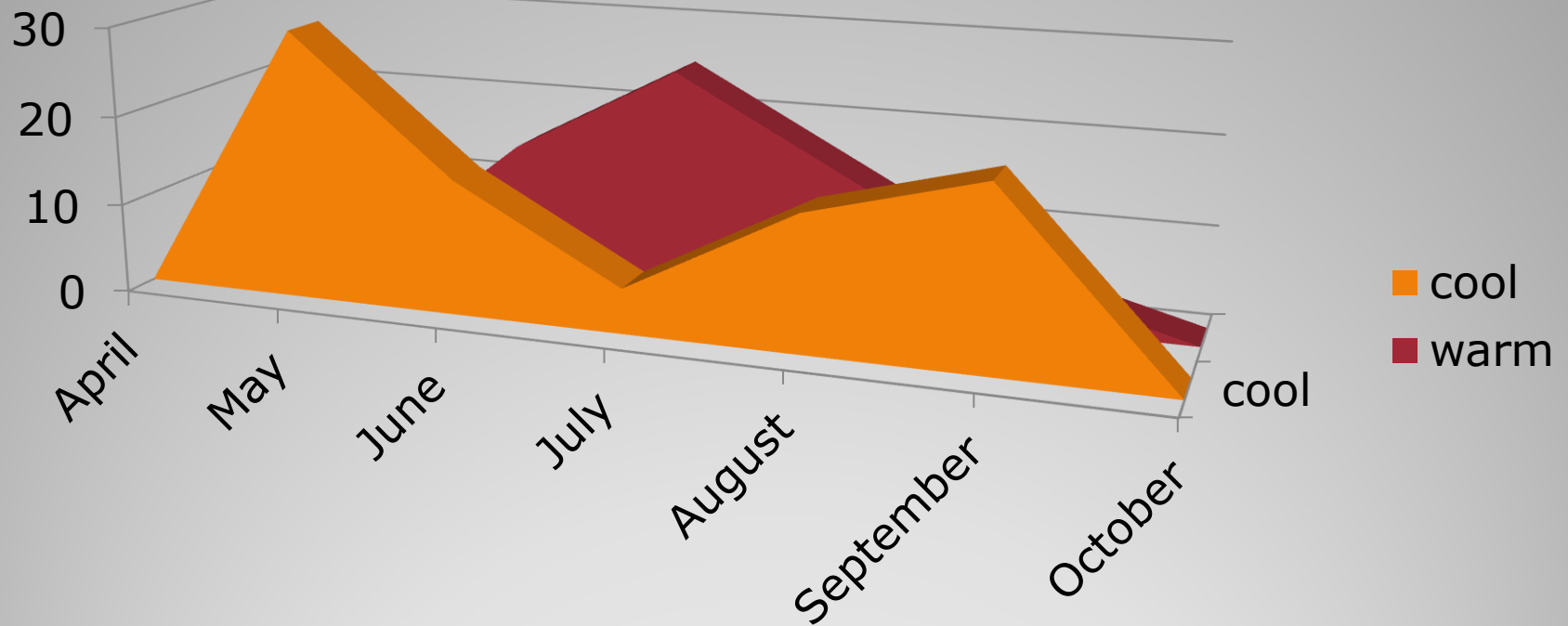
**Quality of Forage**

- **Season**
  - Grass consumed in spring and summer is more abundant and more nutritious than grass in late fall or winter
- **Species**
  - There are many varieties of grasses and legumes; each has its own nutritional strengths and weaknesses
- **Soil**
  - Elements present or lacking in the soil will influence plant growth and chemical composition
- **Management**
  - Cutting, seeding, liming, fertilizing and grazing strategies employed by the landowner will affect forage type and nutrition content
  - Method of harvesting hay, stage of cut, weather at the time, storage
- **Environment**
  - Amount of precipitation leaches nitrogen from the soil
  - Temperature
    - Structural carbohydrates decrease in drought conditions
  - Light

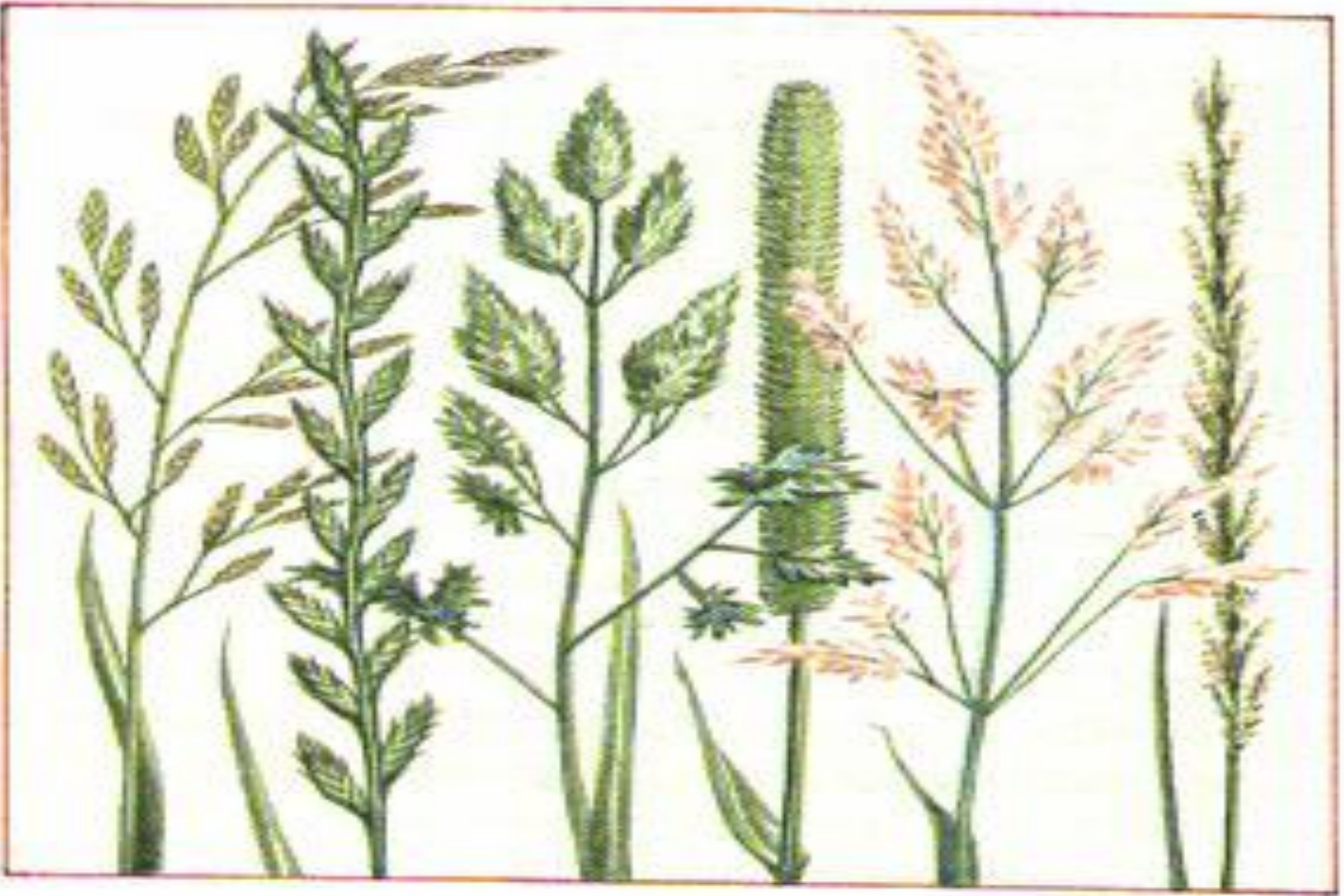
## **Factors affecting variability of forages**

- Sowing complementary grass seeds will extend the growing season and yield in a pasture
  - **Cool weather grasses**
    - Tall fescue
    - Blue grass
    - Orchardgrass
    - Reed Canary Grass
    - Smooth Brome Grass
  - **Warm weather grasses**
    - Caucasian bluestem
    - Big bluestem
    - Indiangrass

**Extending the yield**



## Seasonal Distribution of Cool and Warm Season Grass Production



**Types of Hay**



- There are many different varieties of hay
- They differ chemically and anatomically
  - Grass or seed hay:
    - Fescue
      - There are 320 different varieties of fescue
    - Timothy
    - Rye
    - Orchardgrass
    - Bermudagrass
    - Kentucky Bluegrass
      - The list goes on...
  - Legumes:
    - Alfalfa (aka Lucerne)
    - Clover

## Varieties of Hay



**There are many varieties and combinations of hay types**

- **Alfalfa is a legume**

- Legumes are plants with nitrogen producing nodules in their root systems
  - This means that the protein percentage of the plant will be higher than that of cereal grains or seed hays, comparatively
    - 12-25% protein
      - Provides a broad range of amino acids
      - Alfalfa provides 120% more energy per unit than oat hay
        - This means that you need to feed less
  - Also high in Calcium and vitamins
    - Provides an almost ideal level of calcium, and high levels of vitamin C
  - Alfalfa needs higher temperatures for proper drying
  - Legumes have higher digestibility than grasses when compared at similar levels of maturity
    - The leaves have lower cell wall and higher non-structural carbohydrates

**Alfalfa (aka Lucerne [UK])**



**Alfalfa**

- **Fescue** is the most widely grown forage grass in North America
  - There are 320 different varieties of fescue
- Fescue is a hardy cool season perennial
  - Grows in a variety of soils and climates
  - High yield
  - Resistant to drought and overgrazing
- Tall red fescue can cause abortion in pregnant mares or other fertility-related problems if it has been infected
  - Equine fescue toxicosis is caused by fescue infected with an endophyte fungus **Acremonium coenophialum**

**Fescue**



**Fescue**

- **Rye** is a higher starch plant
  - NSC 18%
  - Protein 10%
  - High in sugars as it's fast growing = higher laminitis risk
- Winter rye is commonly sown in the fall as it is resistant to lower temperatures
- Check for mold as there is an ergot that grows on it

**Rye**

- **Bermudagrass** is common to the US South and Southeast
- It is heat and drought resistant
- It cures very quickly

**Bermudagrass**





**Bermuda grass**

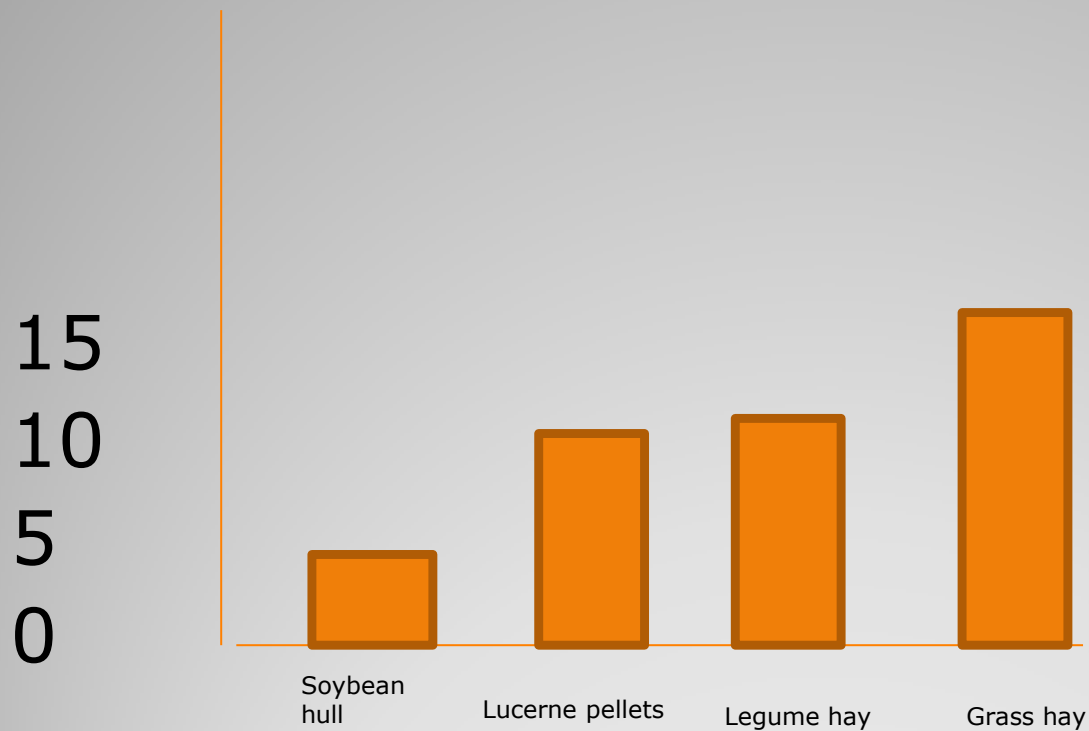
- **Timothy** grows under many different climatic conditions and in many different soils
  - 12% protein
  - high in calcium
- Timothy hay is not prone to getting dusty
- Requires a higher nutrient soil
- Timothy is a preferred hay

**Timothy**



**Timothy**

NSC %



**Non-structural carbohydrate levels  
of roughages**

- The process by which forage is preserved will determine its quality
- Two primary ways to preserve hay:
  - **Remove moisture**
    - Hay
    - Artificially dehydrated crops
  - **Acidify crops**
    - Haylage
    - Silage

# Haymaking

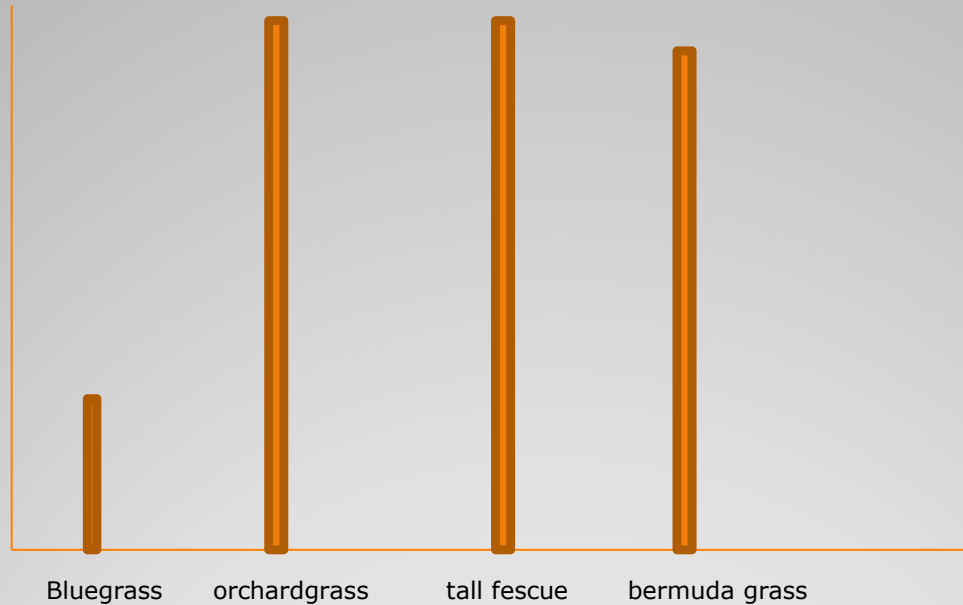


# Haymaking process

- Height
- Of
- Canopy
- In
- Inches

● 10

5



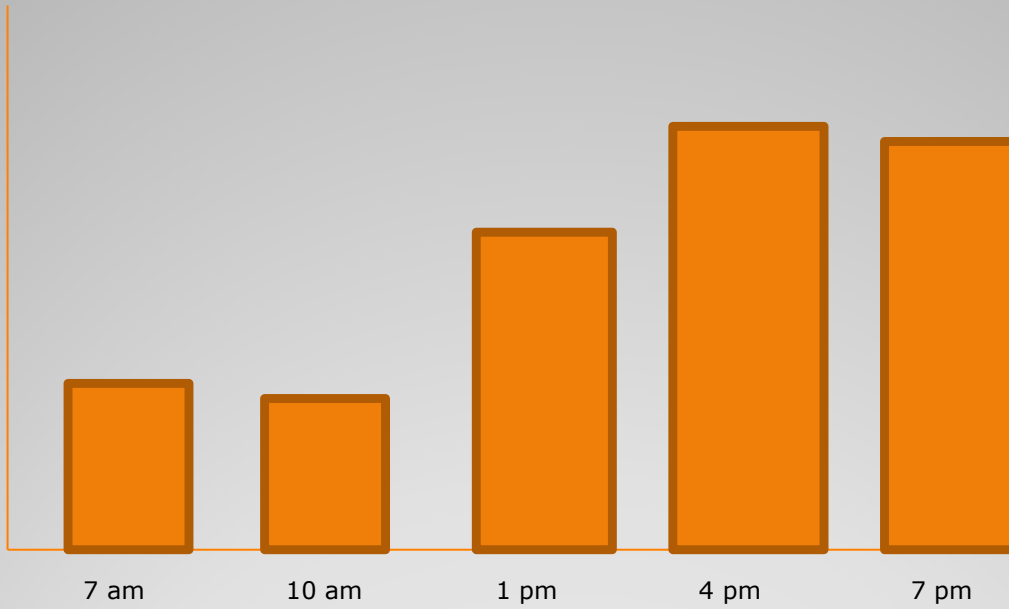
**Mature heights of plants varies between species**

- Grass grows to a mature height
- Dry weather is a necessity prior to and while processing
  - Hay is cut when mature
    - Height at maturity will vary between species
    - Time of cutting will affect nutrient composition
  - Hay must cure for at least a day
    - Newer cutting machines crimp and condition for reduced drying time
  - Hay can be tedded (fluffed up) to promote drying
  - Hay is put into wind rows in preparation for baling
    - Inverted windrows will further dry hay
  - Hay is baled
  - Hay needs to be removed from field into a dry, clean storage area
    - Applications of salt may be required to further dry hay once it is in storage area
    - Spontaneous combustion is a concern if hay is damp

## Haymaking process



• TNG (g/kg)  
• 75 85 95



**Time of Cutting**

**Tedded hay**

**Windrows**



**Haymaking process**



**Baling**

- **Nutrient and dry matter loss** are due to haymaking
- Main losses are from:
  - Rain
  - Mechanical problems
  - Plant respiration
- Length of drying time after cutting affects the nutritive value of hay
- Longer drying = loss of soluble carbohydrates due to cell respiration
- Raking can cause leaf shatter if hay is too dry

**Nutrient losses when haying**

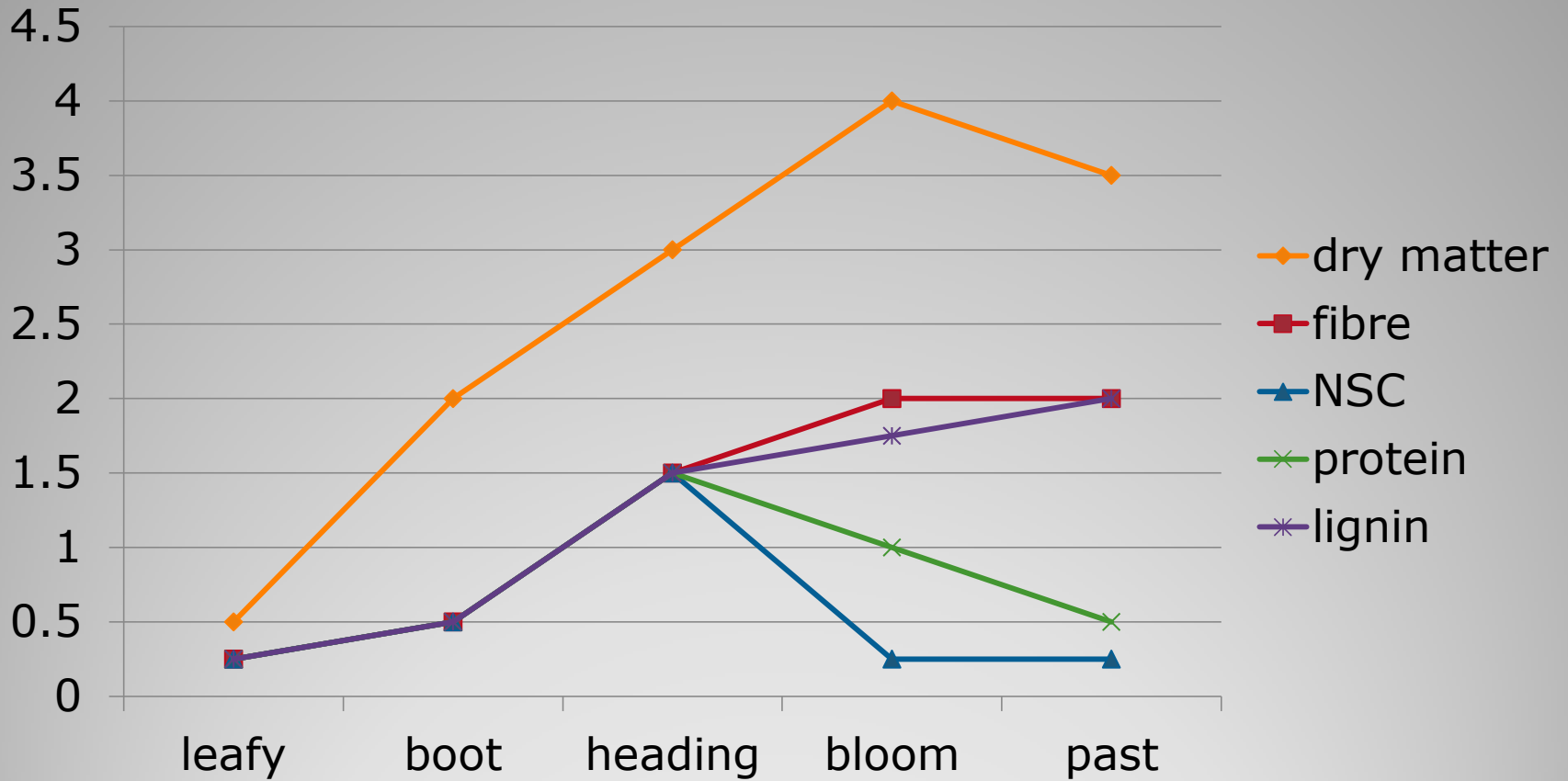
- **Stage of maturity** affects yield
- As plant matures, it goes from leafy to stemmy
  - The more stem, the less digestible
  - Protein decreases
- If hay is cut too late, seed head may have already been lost
  - Highest nutritional value occurs in early bloom stage
  - Lowest nutritional value occurs in full bloom stage

**Maturity of plant when cut**

- Depending upon climatic conditions and yield, some farmers are able to take multiple cuts from a field over a season
- Different cuts will result in different nutritional yields
- Generally, **first cut:**
  - Less legumes/more grasses/may have more weeds
  - Higher sugars, adequate energy and protein
  - Coarser
- **Second cut:**
  - Greener, sweeter smell, softer texture
  - Richer nutrients
- **Third cut:**
  - More legumes/less grasses
  - Higher laminitis risk

**First, second and third cut**

Dry weight of organic materials

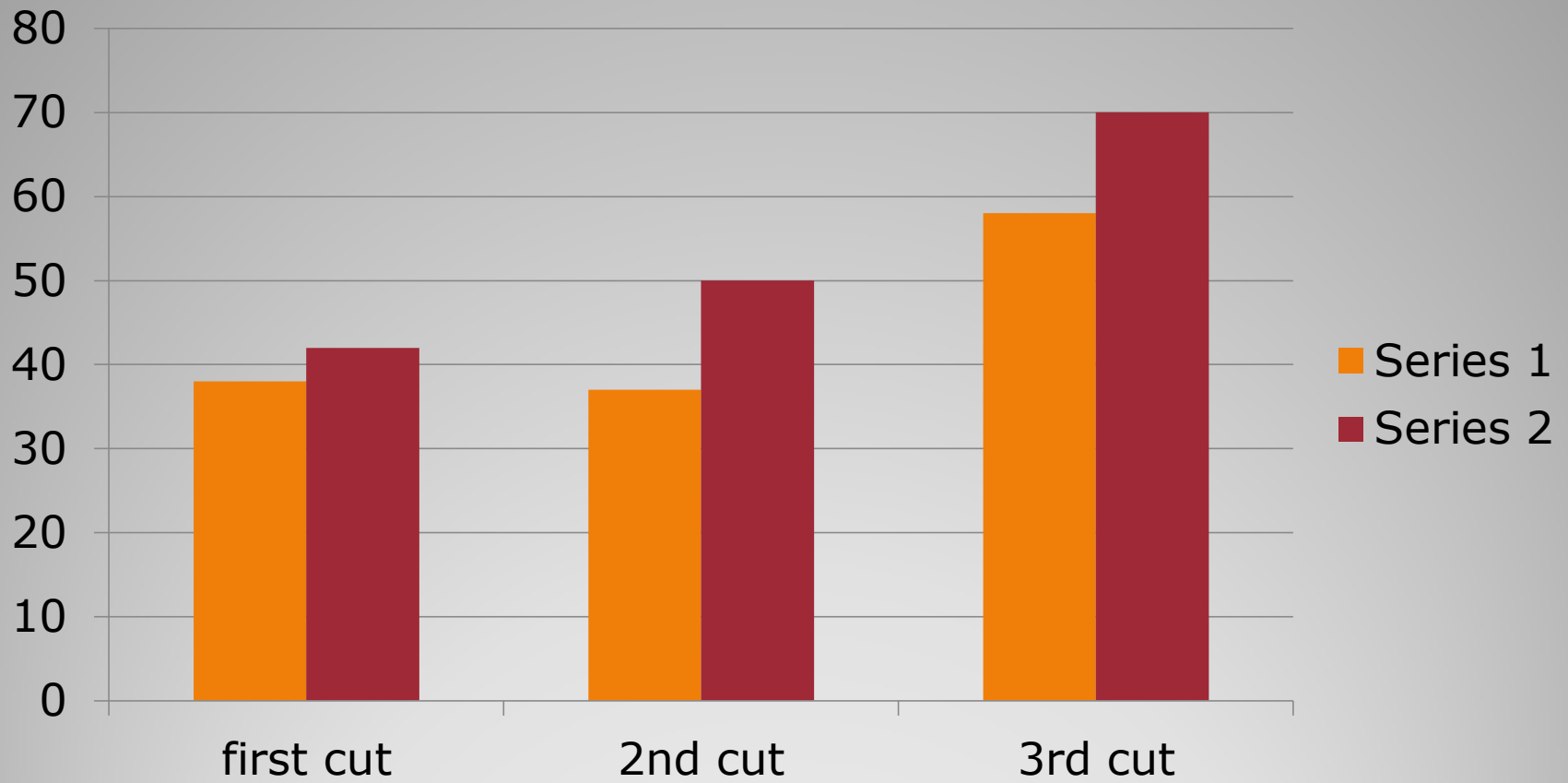


## Dry Matter and Lignin Count of Hays at Different Cut Stages

- **Time of day** that hay is cut makes a difference:
  - Cut in the **afternoon**
    - richer, due to photosynthesis that has occurred during the day
  - Cut in the **morning**
    - lower nutrients
    - This is a better hay choice for laminitis-prone horses and insulin resistant horses

**Time of day hay is cut**





**TNC (g/kg) in a.m. (series 1) and p.m. (series 2)**



## Qualities of Hay

- Hay should be:
  - Crisp
  - Sweet smelling
  - Free from dust, mold and foreign objects
  - Green to greenish yellow
- The **quality of preservation** determines:
  - Palatability
  - Longevity
  - Hygienic quality
  - Nutritional quality
    - Chemical composition of the grasses
    - Maturity level of grasses at time of cutting
    - Plant part: percentage of leaf to stem in the bale

## Qualities of Hay

## Alfalfa



## Timothy



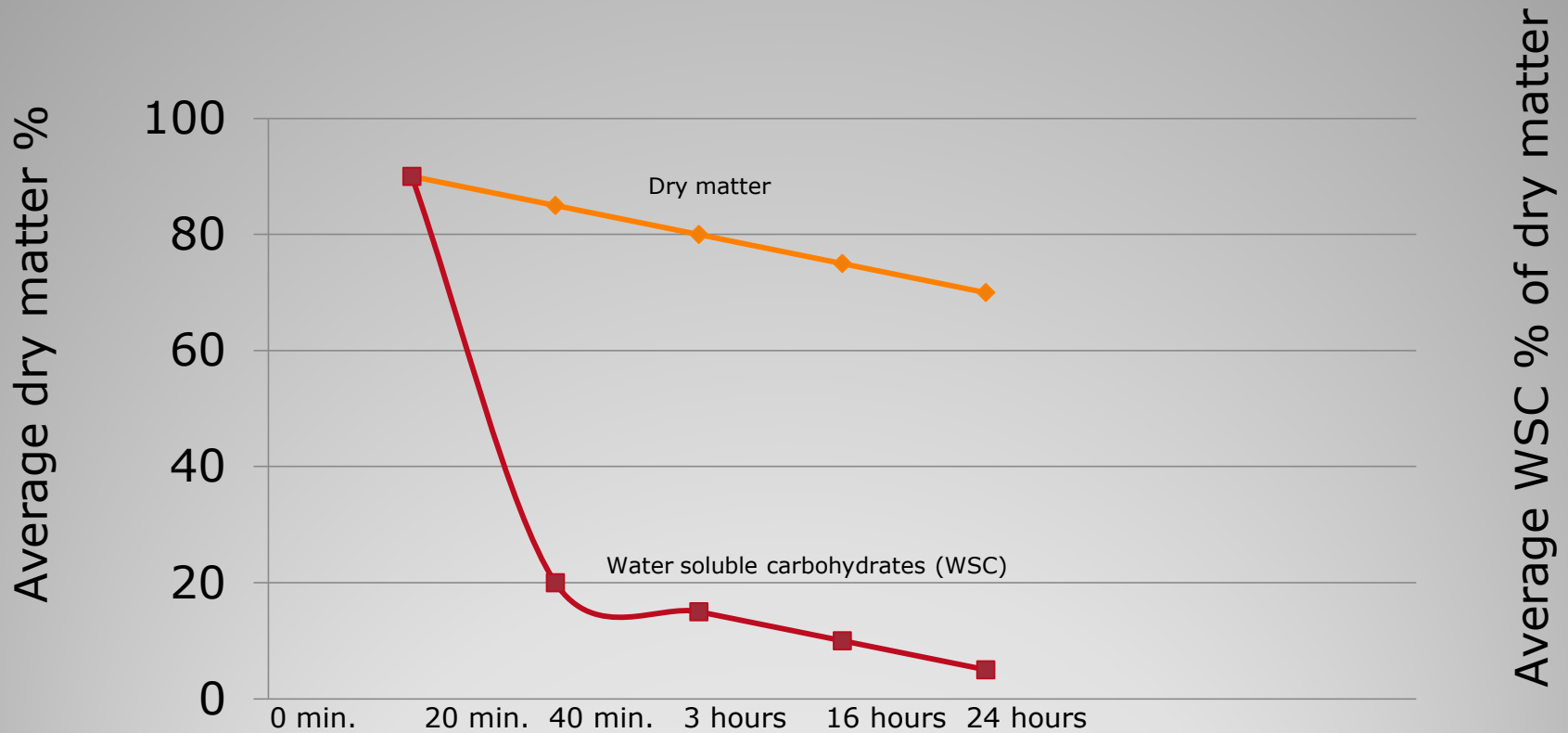
**Good hay has the same qualities,  
regardless of type**

- When conventional haymaking is not an option:
  - **Artificially dried forage** (high temperature drying)
    - Very expensive
  - **Haylage/round bales**
    - Labour saving and convenient when feeding large numbers
    - Less risk of spoilage when fed in winter
      - Does go stale more quickly once the round bale is opened
      - High sugar/high nutrient leaves can all filter to the bottom, and when consumed can cause laminitis, colic, and non-productive growth spurts in growing horses
  - **Silage**
    - Not considered consistently safe enough for horses due to high moisture levels that can lead to development of toxins

## Alternatives to Conventional Haymaking

- Once hay has been made, **soaking** may be necessary prior to feeding
- This may be due to:
  - Dusty hay
  - Horse with COPD
- When hay is soaked, nutrients may be lost:
  - Water soluble carbohydrates
  - Protein
  - Minerals
- To minimize nutrient loss, fully submerge hay for no more than 10 minutes
- **Steaming** is an alternative to soaking which results in less nutrition loss, comparatively

## Soaking or Steaming Hay



**Effect of soak time on average DM and WSC content of several cool season grass hays**

- Ways of harvesting hay:
  - Stooks/loose hay piles are rarely seen today
  - Baled hay – weight increases as number of strings increase
  - Round bales – encased in plastic
    - Can be harvested faster
    - Very heavy and require machinery to move
    - Can go stale quickly once opened and exposed to air
  - Silage/hayage – less common with horses
- Ways of feeding in the barn
  - On the ground
    - More waste
    - Stretches topline and drains sinuses if this is an issue
  - Hayrack
    - More controlled, less waste than feeding on the ground
    - Hay may fall in eyes
  - Slow feeders or haynets
    - Good for horses on dry lots
    - Simulates natural feeding
    - More beneficial than free choice or meal feeding
    - Increased chewing over the 24 hour period results in more saliva which is a buffer that can protect against ulcers

## Ways to harvest and feed hay



- 1. Describe the haymaking process.
- 2. What are forages.
- 3. Discuss legumes.
- 4. What are some concerns when feeding rye?
- 5. Compare and contrast fescue and timothy.
- 6. Discuss the factors affecting the variability of forages.
- 7. Compare and contrast first, second and third cut hay.
- 8. Name three things that nutrient losses when haying arise from.
- 9. Compare and contrast hay cut in the morning versus hay cut in the afternoon.

## Questions