BIHAR ANIMAL SCIENCES UNIVERSITY, PATNA
Animal Nutrition

UNIT-IV (NON-RUMINANT NUTRITION)

UG Lecture on

Feeding of Equine (Foal, Yearling, Brood Mare, Stallion & Race Horses)

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Objective

- Learn about the feeding of horses according to their physiological status and work level.
FEEDING OF HORSES

Some important points that are to be considered while feeding the horses:

- If horse is of good breed, well managed, good health, lives in a suitable environment, then nutrition will be main factor influencing its performance.
- Generally, horses undergoing only limited activity or light work are fully nourished by good quality pasture.
- However, variable nutritional value of pasture, horses might not get enough nutrition from grazing, and need a supplement.
- Supplemental feed should be aimed to meet horse’s nutritional needs that not available from the grazing.
When horses do not have access to grazing then balanced ration needs to be supplied.

When grazing is adequate, the addition of minerals and vitamins to the diet is not usually necessary.

However, mineral/vitamin supplement may be necessary, if roughage quality is poor.

Salt should be supplied freely to working horses because considerable quantities are excreted in sweat.

The provision of salt blocks or rock salt in feed boxes will help ensure adequate intake.
Feeds for horses

- **Roughage** (hay or grasses) and **concentrates** (grains, grain by-products and oil cakes) are common feed.
The dry matter intake of horses is **1.5–2.5%** of their BW per day

<table>
<thead>
<tr>
<th>Type of work</th>
<th>Feed per 100 kg live weight</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Roughage (kg)</td>
<td>Concentrate (kg)</td>
<td></td>
</tr>
<tr>
<td>Ideal</td>
<td>1.5</td>
<td>Nil</td>
<td></td>
</tr>
<tr>
<td>Light (2 hours/day)</td>
<td>1.25–1.5</td>
<td>0.5–0.75</td>
<td></td>
</tr>
<tr>
<td>Medium (2 hours/day)</td>
<td>1–1.5</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Heavy (4 hours/day)</td>
<td>1.0</td>
<td>1.0–1.5</td>
<td></td>
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</tbody>
</table>
Feeding management of horse

- See the individual horse feeding habits, and adjust rations accordingly.
- Working horse total ration should be fed thrice per day.
- Feed a quarter of concentrate required at morning & mid day, remaining half at night.
- Reduce the amount of concentrate by 50–70% on non-working days of horse.
- Make any changes in the ration gradually over a period of 10–14 days.
- Keep feed and water troughs clean, and remove leftovers.
- Don’t allow a horses to drink large quantities of water immediately after exercise.
- Allow the horse to drink only 2–4 L, and then let it cool before allowing free access.
- Avoid working the horse on a full stomach & allow at least 2 hrs for digestion.
**FEEDING FOALS**

- Feeding of foals is according to its age.
- **Mare milk can meet the requirement of foal up to the first 3 months age.**
- Composition of mares milk:
  - Fat - 1.25, Crude protein - 2.1%, Lactose - 6.3%, Ash - 0.4% & Gross energy - 480 Kcal/kg.
- **Colostrum feeding provides immunity to the foal.**
Feeding orphan foal

- Foal can be injected with horse serum for immunity.
- Fostering or hand rearing by bottle or bucket feeding can be carried out.
- Modified cow milk - cow milk 600 ml + 150 ml lime water + 1 spoon sugar.
- Frequency of feeding once in 2 hours- first 2 weeks, once in 4 hours - next 2 weeks and 4 times a day feeding upto weaning.
Creep feed for foal

- **Beyond 1.5 month** additional creep feed can be provided.
- Creep feed should provide 75 % TDN and 16 % crude protein with **highly digestible ingredients**.
- It can be fed @0.5 to 1 % of the foals body weight.
# Creep Feed Composition

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Percent in Feed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oats groats rolled</td>
<td>15</td>
</tr>
<tr>
<td>Flaked oats</td>
<td>20</td>
</tr>
<tr>
<td>Flaked maize or sorghum</td>
<td>35.75</td>
</tr>
<tr>
<td>Soy bean meal</td>
<td>15</td>
</tr>
<tr>
<td>Skim milk powder</td>
<td>5</td>
</tr>
<tr>
<td>Molasses</td>
<td>5</td>
</tr>
<tr>
<td>Di-calcium phosphate</td>
<td>2</td>
</tr>
<tr>
<td>Ground limestone</td>
<td>0.75</td>
</tr>
<tr>
<td>Mineral mixture</td>
<td>1</td>
</tr>
<tr>
<td>Vitamin supplement</td>
<td>0.5</td>
</tr>
</tbody>
</table>
FEEDING OF YEARLINGS

The following is the feeding schedule for yearlings

- **3-6 months**: 500 gm grain or concentrate mixture & 1 Kg good quality hay.
- **6-9 months**: 1 kg grain or concentrate mixture & 2-3 Kg good quality hay.
- **9-12 months**: 2 kg grain or concentrate mixture & 4-5 Kg good quality hay.
## Concentrate mixture for yearlings

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Percent inclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crushed oats</td>
<td>25</td>
</tr>
<tr>
<td>Flaked maize or barley</td>
<td>30.8</td>
</tr>
<tr>
<td>Crushed sorghum</td>
<td>15</td>
</tr>
<tr>
<td>Soy bean meal</td>
<td>15</td>
</tr>
<tr>
<td>Alfa alfa meal</td>
<td>5</td>
</tr>
<tr>
<td>Molasses</td>
<td>5</td>
</tr>
<tr>
<td>Vitamin supplement</td>
<td>0.7</td>
</tr>
<tr>
<td>Dicalcium phosphate</td>
<td>2</td>
</tr>
<tr>
<td>Ground limestone</td>
<td>0.5</td>
</tr>
<tr>
<td>Mineral mixture</td>
<td>1</td>
</tr>
</tbody>
</table>
Discussions........................................

Questions, if any..............................??

THANKS
Objective

- Learn about the feeding of Stallion, Mares and Race horses of different physiological activity & work conditions.
FEEDING OF STALLION

The feeding of stallion is critical for its breeding performance.

- Amount of energy required by the stallion during the act of mating is quite small, but for additional physical activity & psychological response to breeding, increases the dietary energy needs.
- During the breeding season, more energy-dense feeds (grains) to be included in the ration to meet the stallion energy requirements.
- Vegetable oil can also be used to provide extra energy which can reduce the inclusion of large amounts of grain.
- Stallion should be fed high quality hay at a minimum level of 1.0 % of BW.
- Stallions, used to mate many number of mares will require energy-dense grains @0.75 kg/100 kg BW.
- Other nutrient requirements also increase during the breeding season.
- Providing a suitable vitamin/mineral supplement.
- If stallion already receiving balanced diet then adding extra feed or supplements to the diet will not enhance fertility.
- Stallions that exercised regularly should be fed as per their level of work.
- After breeding season, maintain on maintenance ration by increasing the hay portion and decreasing the grain portion of the ration.
FEEDING OF MARE

Feeding of mares should be carried out according to its physiological status.

- Nutrients such as energy, protein, minerals (Ca, P, Mn, Cu, Zn & I) and vitamins (A, D & E) are important for the pregnant and lactating mare.
- Good quality pastures or hays can meet the nutrient requirement of mares.
- Grain can be supplemented when more energy requires or poor hay quality.
Feeding of pregnant mares

- In early to mid-gestation, nutrient demands for developing fetus are minimal.
- Growth of the foal ranges 90 to 220 g per day, therefore, the mare's nutrient requirements in early to mid-gestation are similar to maintenance ration.
- During late gestation the foal is growing @350 to 450 g/day so, to support this growth, the mare's energy & protein requirements increase.
- Foetal uptake of minerals is enhanced during the last trimester, so, dietary Ca & P requirement increased substantially.
- Elevated energy & protein requirements of a mare in late gestation can be met by increasing the amount of mixed hay of leguminous species & grass.
- Adequate intakes of minerals and vitamins are also provided.
Feeding of lactating mares

- Mare at the time of lactation should have a good body condition.
- Under feeding mares during lactation can lower milk production, ultimately affecting the growth of foal.
- A thin body condition will also decrease the mare's ability to be re-bred.
- In addition to its own needs, mare produce 2 to 3% of her BW/day as milk.
- The energy and protein requirement increase 75 to 100 per cent.
- Lactating mare needs 3 times more calcium & 2.5 times more phosphorus as needed in early gestation.
- When fed grass hay alone then supplements the protein, energy & MM.
- The mare's nutrient requirements decline in the 4th, 5th & 6th months of lactation, as milk production declines.
FEEDING OF RACE HORSES

- Horse performing light work for 2-3 hrs/day, their energy requirements increases 50% above maintenance.

- Horse performs moderate work such as fast trotting, cantering, jumping, etc. for 4-5 hrs/day, energy requirement increased by 70% above maintenance.

- It is not possible to meet the energy needs by feeding roughage alone in above conditions.

- Further, horses after several hours of work do not eat enough, hence, the energy density of the ration has to be increased by supplementing grains.

- Addition of fat to the ration upto 10% also increases the energy density.
Ration for 500 kg horses performing light work
1. Alfa alfa / grass hay – 7 Kg
2. Crushed oats / barley – 2 Kg
3. Mineral mixture – 30 g
4. Iodised salt – free choice

Ration for 500 kg horses performing moderate work
1. Alfa alfa / grass hay – 8 Kg
2. Crushed oats / barley – 3 Kg
3. Mineral mixture – 30 g
4. Iodised salt – free choice
Ration for 500 kg horses performing intense work

1. Alfa alfa / grass hay – 9 Kg
2. Crushed oats / barley – 4.5 Kg
3. Oil – 500 g
4. Mineral mixture – 30 g
5. Iodised salt – free choice
Feeding of horses before riding

- High intensity work
  - Remove hay 4 hours prior to competition.
  - Feed grain 4 hours before competition.

- Light to moderate intensity work
  - Remove hay 4 hours before riding.
  - Adapt horse to eating smaller quantity of ration by spread throughout the day.
  - Feed grain 4 or more hours before riding.

- Long distance races
  - Allow free access to hay right up to the competition or even during the ride.
  - Feed large quantity of grains/CM 4 hours before the ride.
  - Feed smaller quantity of grain throughout the ride.
GUIDELINES FOR FORMULATION OF RATIONS OF EQUINES

Feed intake & Forage : Concentrate Ratio for different categories of Horses

<table>
<thead>
<tr>
<th>Factor</th>
<th>Feed Intake</th>
<th>% of Body Weight</th>
<th>Forage:Concentrate Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance</td>
<td></td>
<td>1.5</td>
<td>100:0</td>
</tr>
<tr>
<td>Pregnancy</td>
<td></td>
<td>2.2</td>
<td>75:25</td>
</tr>
<tr>
<td>Lactation</td>
<td></td>
<td>2.2</td>
<td>55:45</td>
</tr>
<tr>
<td>Work</td>
<td>Mild</td>
<td>1.5</td>
<td>65:35</td>
</tr>
<tr>
<td></td>
<td>Hard</td>
<td>1.5</td>
<td>30:70</td>
</tr>
<tr>
<td>3-month foal</td>
<td></td>
<td>3 - 4</td>
<td>0:100</td>
</tr>
<tr>
<td>6-month foal</td>
<td></td>
<td>2 - 2.5</td>
<td>25:75</td>
</tr>
<tr>
<td>12-month yearling</td>
<td></td>
<td>2.0</td>
<td>35:65</td>
</tr>
</tbody>
</table>
Some common nutrition associated problems in equines

Nutritional Secondary Hyperparathyroidism/
Big Head Disease

Colic

Laminitis

Changes that occur to the foot as a result of laminitis

Structure of a normal foot

Deep flexor tendon

The laminitic foot

Space left when laminae tear from hoof wall

Tip of rotated pedal bone pressing on sole
Discussions

Questions, if any

THANKS