The primary mineral needs in horse nutrition are salt, calcium and phosphorous. No other animal faces a critical need for salt like the working horse. The horse may lose up to 75 grams daily (454 grams per pound) through sweat and urine. For this reason, salt should be available free choice to the horse at all times. Calcium and phosphorous are the other two critical minerals needed in horse nutrition, since most other minerals such as potassium, magnesium, sulphur, copper, cobalt and zinc, which are required by the horse, are only needed in small amounts and are usually provided by normal feedstuffs. Trace mineralized salt should be used with horses. Therefore, the primary concern in mineral nutrition is to provide adequate levels of calcium and phosphorous in approximately a 1.3 to 1 ratio.

Table 1 indicates the calcium-phosphorous requirements for a horse which is growing to a mature weight of approximately 1,100 pounds. The requirements indicate that during the first year of a horse's life when the horse grows to approximately 95% of his adult height, the calcium-phosphorous requirement is greatest. The requirement of mature horses is low compared to young growing horses. However, the calcium and phosphorous level in mare's milk is quite high and the lactating mare's requirement is increased accordingly.

**Table 1 Requirements for 1,100 Pound Mature Horse**

| Age or Status | Ca (%) | Phos (%) | Ratio |
|---|---|---|---|
| 3 months old | .89 | .69 | 1.3 to 1 |
| 6 months old | .80 | .55 | 1.4 to 1 |
| 12 months old | .60 | .44 | 1.3 to 1 |
| Mature Horse at Rest | .34 | .26 | 1.3 to 1 |
| Mare, Last 90 Days of Preg. | .45 | .35 | 1.3 to 1 |
| Mare, Peak of Lactation | .60 | .45 | 1.3 to 1 |

As well as providing the minimum levels of calcium and phosphorous, the proper proportions are extremely important. Rations should never have less than a 1 to 1 ratio and although young horses can tolerate up to a 2 to 1 ratio, and mature horses a 3 to 1 ratio, calcium to phosphorous ratios over 1.5 to 1 are not recommended. Note that the ratio of calcium to phosphorous is approximately 1.3 to 1 in Table 1.

Table 2 shows the calcium and phosphorous levels in common grains and hay. Note particularly that all grains, with the exception of alfalfa pellets, are extremely low in calcium and high in phosphorous. Note also that the phosphorous level in some grains is adequate to meet the phosphorous requirement of horses. In order to balance a total grain ration, additional calcium would be needed to develop the proper ratio. Alfalfa pellets provide a 5 to 1 ratio of calcium to phosphorous. Therefore, it is useful in grain rations as a calcium source.

**Table 2 Mineral Requirements For Horses**

| Grain | Ca (%) | Phos (%) | Ratio |
|---|---|---|---|
| Oats | 0.10 | 0.35 | 1 to 3.5 |
| Corn | 0.02 | 0.31 | 1 to 15 |
| Barley | 0.08 | 0.42 | 1 to 5 |
| Wheat Bran | 0.14 | 1.17 | 1 to 8 |
| Soybean Meal | 0.32 | 0.67 | 1 to 2 |
| Alfalfa Pellets (17% dehydrated) | 1.43 | 0.29 | 4.7 to 1 |

| | | | |
|---|---|---|---|
| **Hay** | | | |
| Bermuda | 0.42 | 0.18 | 2 to 1 |
| Bahia | 0.40 | 0.20 | 2 to 1 |
| Ryegrass | 0.32 | 0.24 | 1.5 to 1 |
| Alfalfa | 1.21 | 0.22 | 5 to 1 |
| Lespedeza | 1.14 | 0.23 | 5 to 1 |

Most hays have a high calcium to phosphorous ratio, with the legume hays having a 5 to 1 ratio and the grass hays having a 2 to 1 ratio. However, the calcium and phosphorous in hay is dependent upon the fertilization and handling of the hay. Poor quality forage may result in deficiencies.

Proper calcium-phosphorous ratios can be obtained with common feedstuffs by using a combination of grain and hay. In rations where only forage is utilized, an adequate calcium-phosphorous ratio is normally maintained and no supplementation is indicated. However, if alfalfa or lespedeza is the primary forage source, excessive calcium would be fed and abnormal bone growth in colts may occur. Therefore, limiting alfalfa to 1/3 of the hay source is recommended.

Rations which utilize large quantities of whole grains should be supplemented with calcium. The calcium can be provided from quality hay or added to the ration in one of the mineral supplements listed in Table 3. Horsemen who are mixing their own rations should consider calcium supplementation. Dicalcium phosphate or limestone are normally available from feed distributors.

**Table 3 Composition of Mineral Supplements**

| **Mineral Sources** | **CA (%)** | **Phos (%)** |
|---|---|---|
| Calcium Carbonate | 38.0 | - |
| Dicalcium Phosphate | 22.0 | 18.5 |
| Limestone | 33.0 | - |
| Bone Meal | 24.0 | 12.0 |
| Defluorinated Phosphate | 32.0 | 18.0 |

The mixed feeds available from most feed dealers are balanced for calcium and phosphorous normally with the 1 to 1 ratio. The basic assumption of the feed dealer is that hay or pasture will be provided and therefore a higher than 1 to 1 ratio of calcium-phosphorous will be available for the horse. However, most rations for young, growing colts up to a year of age should provide all the calcium and phosphorous in the desired ratio that the colt will need, since colts do not normally consume adequate amounts of forage.