

# Diet And Feed Adjustments For Ungulates At The Taipei Zoo

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Currently, the Taipei Zoo exhibits and cares for 377 types of ungulates, representing 11 families, of 44 species. Since 1997, the zoo has monitored and adjusted the types of feed offered to our ungulates. Diet formulas began with fresh forage and edible hay, which included six kinds of fresh grass, branches, and leaves as shown in Table 1.

These plants serve as the major foods for our ungulates, thus effectively reducing the undesirable condition of soft excrement, so often seen with giraffes. We experimented with five kinds of imported hay between 1997 and 1999, eventually eliminating all but one type, the domestically produced Pangola hay that was fed exclusively, since October 1999. In light of the damp weather (the annual Monsoon season) at Taipei, especially in wintertime, the hay storehouse is air-conditioned and kept at the constant temperature of 16~18°C. Two dehumidifiers are used to control dampness in the storehouse and are on all day to keep the relative humidity under 75%.

We also increase different alfalfa elements in the compound feed in order to bring up the content of vitamin E from 100 IU/kg to 400 IU/kg. As an example, our for local Formosan serow (*Capricornis crispus swinhoeo* Gray), we started to increase the supply of compound feed and vitamin E additive to their diet in 1997, and improved the feeding method of branches and leaves (Tables 2 and 3).

## Mineral and Vitamin Supplements

Mineral and vitamin per 2 kg including: vitamin A: 1300,000 IU, vitamin D<sub>3</sub>: 2600,000 IU, vitamin E: 45,000 IU, vitamin K<sub>3</sub>: 1500 mg, vitamin B<sub>1</sub>: 1800 mg, vitamin B<sub>2</sub>: 5000 mg, vitamin B<sub>6</sub>: 4000 mg, vitamin B<sub>12</sub>: 25 mg, biotin 120 mg, pantothenic acid: 15,000 mg, carbosan; minerals: 10.36 mg, carbosan Zinc: 51.84 mg, carbosan copper: 5.0 mg, carbosan iron: 60.0 mg, iodine: 1.5 mg, selenium: 0.25 mg, cobalt: 0.3 mg. Add 5g twice a week. vitamin E: 500 IU/g. Add 1 g twice a week.

There are less episodes of diarrhea and higher survival rates of young animals in the winter since the dietary changes listed above have been implemented. On this diet, the Formosan serow at the zoo multiplied from four individuals in 1997 to a herd of 11 in the year 2000.

## **Parasite Treatment and Control**

The numbers of ungulates at the zoo are more than 300, so we attempted, in May 2000, to add anthelmintic (5 mg/kg body weight flubendazole) in the compound pellet feed for parasite control. Numerous *Ascaris* were purged from our Mongolian wild horses and zebras only one day after administration and treatment. In October of 2000, the same method (Ivermectin 0.2 mg/kg body weight) was used to purge *Nematodes* with similar good effects. As part of our parasite control efforts at Taipei zoo, ongoing treatments from February 2001 include adding Ivermectin 0.2 mg/kg body weight for all African area animals. We will continue to add suitable doses of anthelmintic in the compound feed pellets to address the specific needs of certain species.

## **Feed quality control and analysis**

Since February of 2001, we set up a near-infrared spectroscopy laboratory at the Taipei Zoo for feed quality control and diet analysis.

**TABLE 1. Common and scientific names of the six kinds of fresh grass, branches and leaves used in feeding ungulates at the Taipei Zoo**

English Name	Scientific Name	Amount Offered to Ungulates
Napier grass	<i>Pennisetum purpureum</i>	3200 kg/day
Mulberry	<i>Morus australis</i>	160 kg/day
Paper mulberry	<i>Broussonetia papyrifera</i>	40 kg/day
Indiacharcial Trema	<i>Trema orientalis</i>	80 kg/day
Sweet potato	<i>Ipomoea batatas</i>	20 kg/day
Banana	<i>Musa sapientum L.</i>	Twice a week (four types)

**TABLE 2. Sample ingredients and quantities of feeds included in the diet of the Formosan serow (*Capricornis crispus swinhoeo* Gray) at the Taipei Zoo**

Types of Food	Mulberry	Paper mulberry	Indiacharcial Trema	Carrot	Sweet potato	Compound feed
Amount	4 kg	1 kg	0.5 kg	250g	200	100 g

**TABLE 3. Selected nutrient analysis of the diet offered to Formosan serow (*Capricornis crispus swinhoeo* Gray) at the Taipei Zoo**

Amount, kg	Energy, kcal	Moisture, g	CP, g	C Fat, g	C fiber, G	NDF, g	Ash, g	Ca, mg	P, mg
6.050	4679.1	4587.4	323.2	72	687.8	215.5	164.4	625	565