

**Production and utilization of cassava
in integrated farming systems
for smallholder farmers
in Vietnam and Cambodia**

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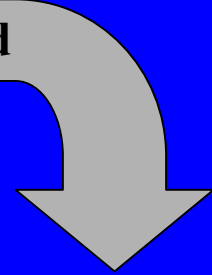
Cassava (*Manihot esculenta*)

- **As a semi-perennial forage**
- **In integrated farming system(with recycled biodigester effluent)**
- **As replacement for soya bean meal (the foliage)**
- **Control of intestinal nematodes in small and large ruminants**

Crops, trees, shrubs



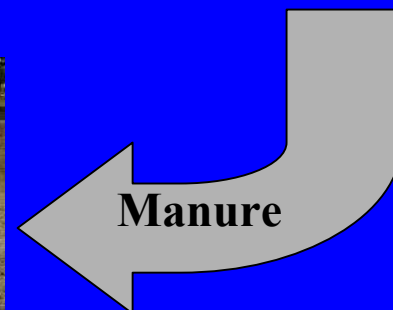
Feed



Livestock



Manure



Family



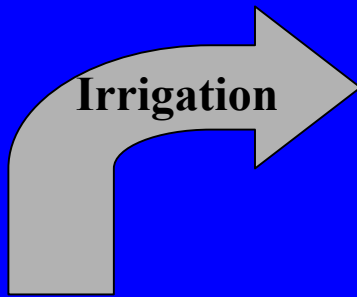
Excreta

Biogas



Biodigester

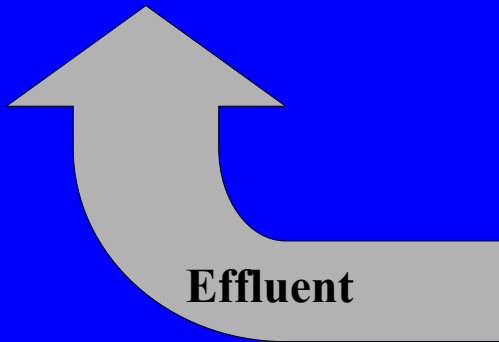
Irrigation



Pond



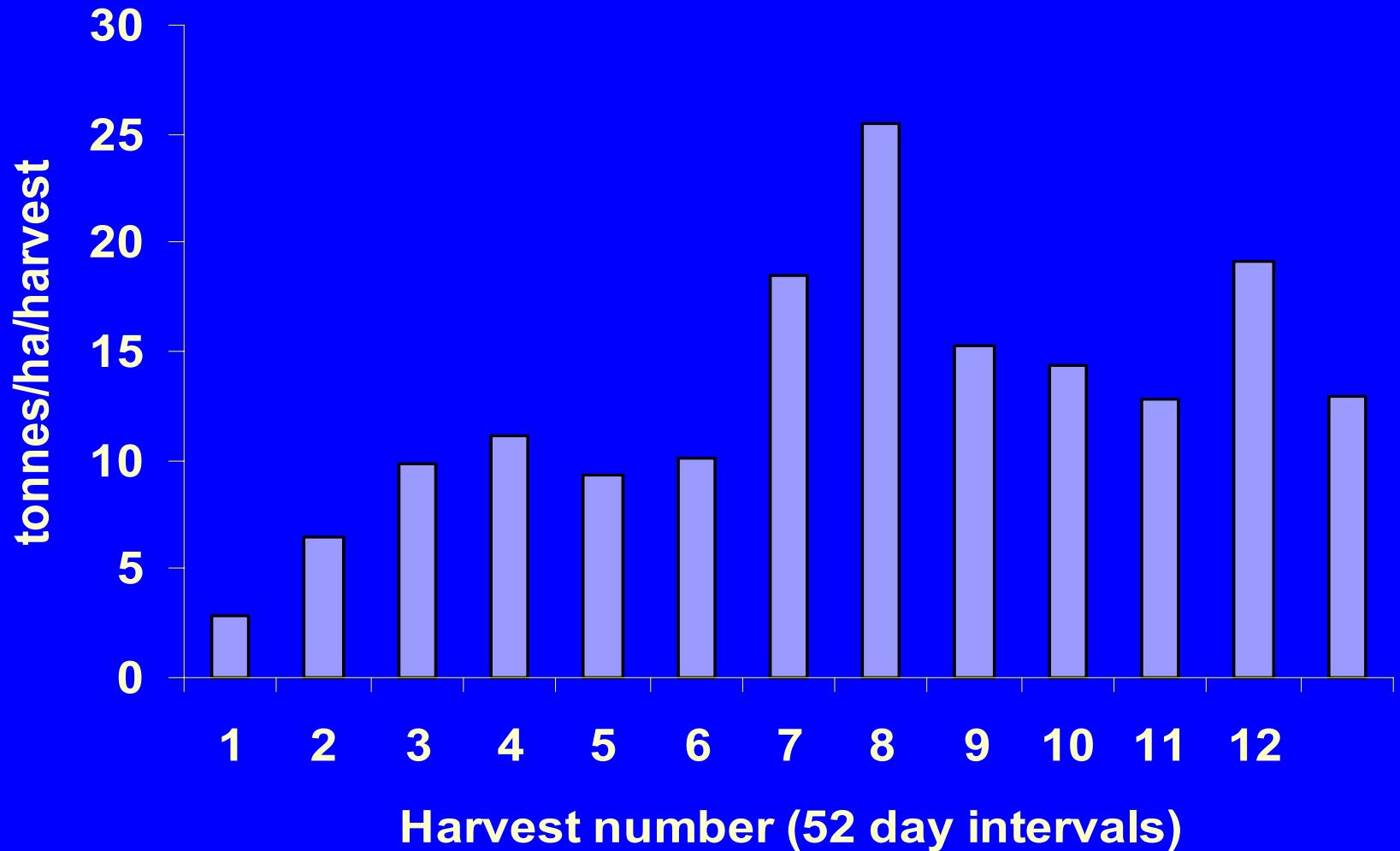
Effluent



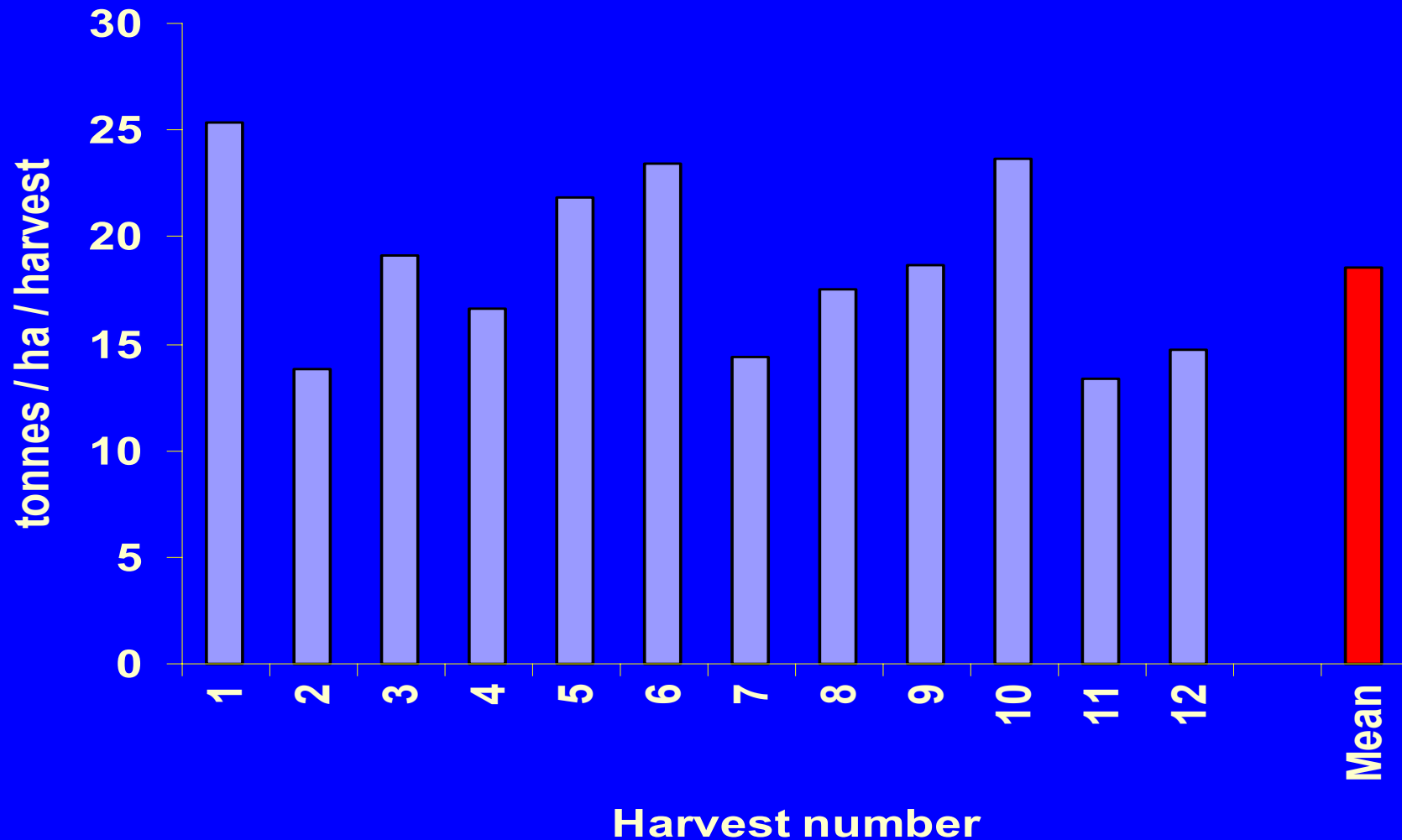
The ecological farm



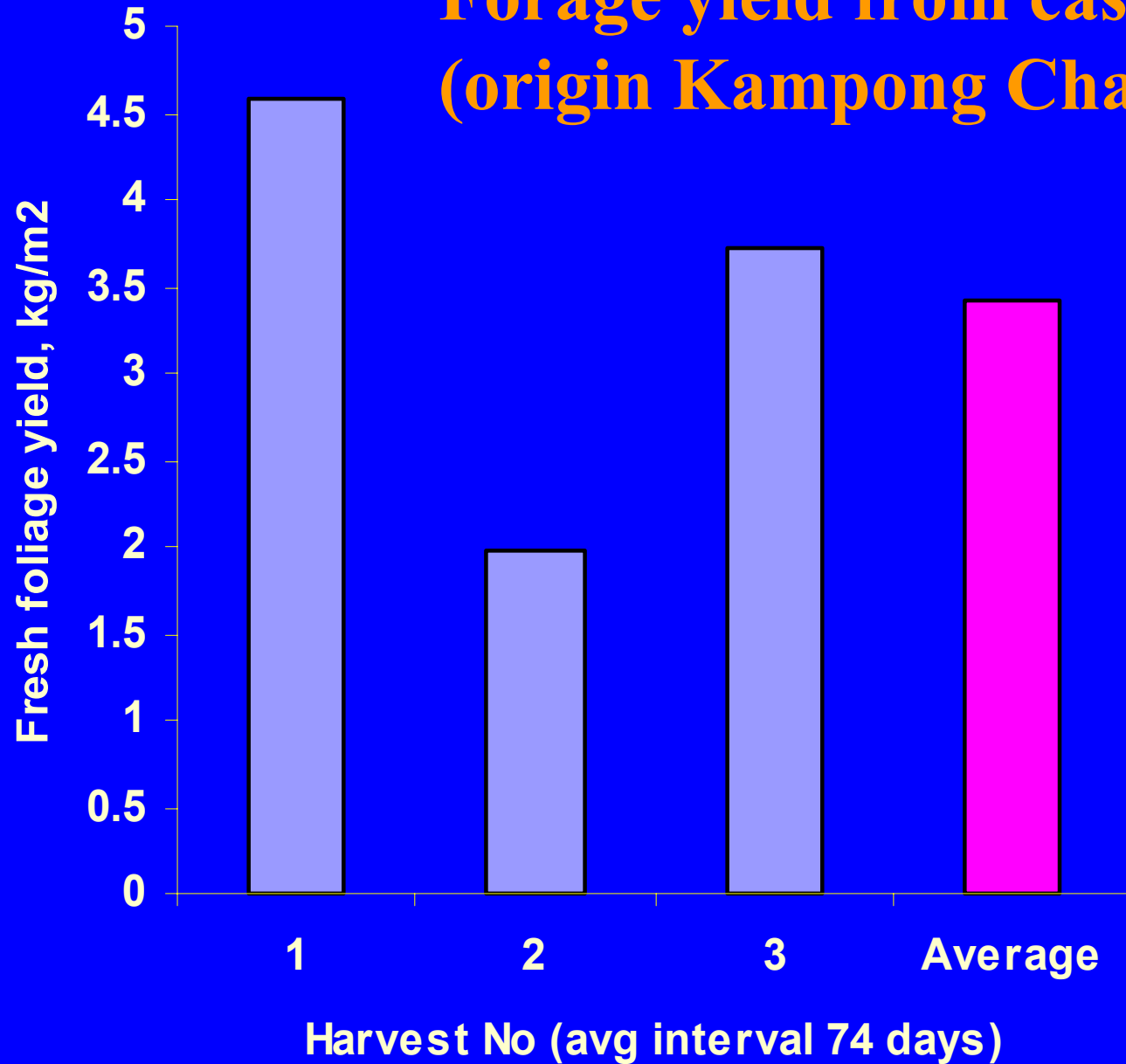
Production of foliage from cassava managed as perennial shrub (Vietnam)



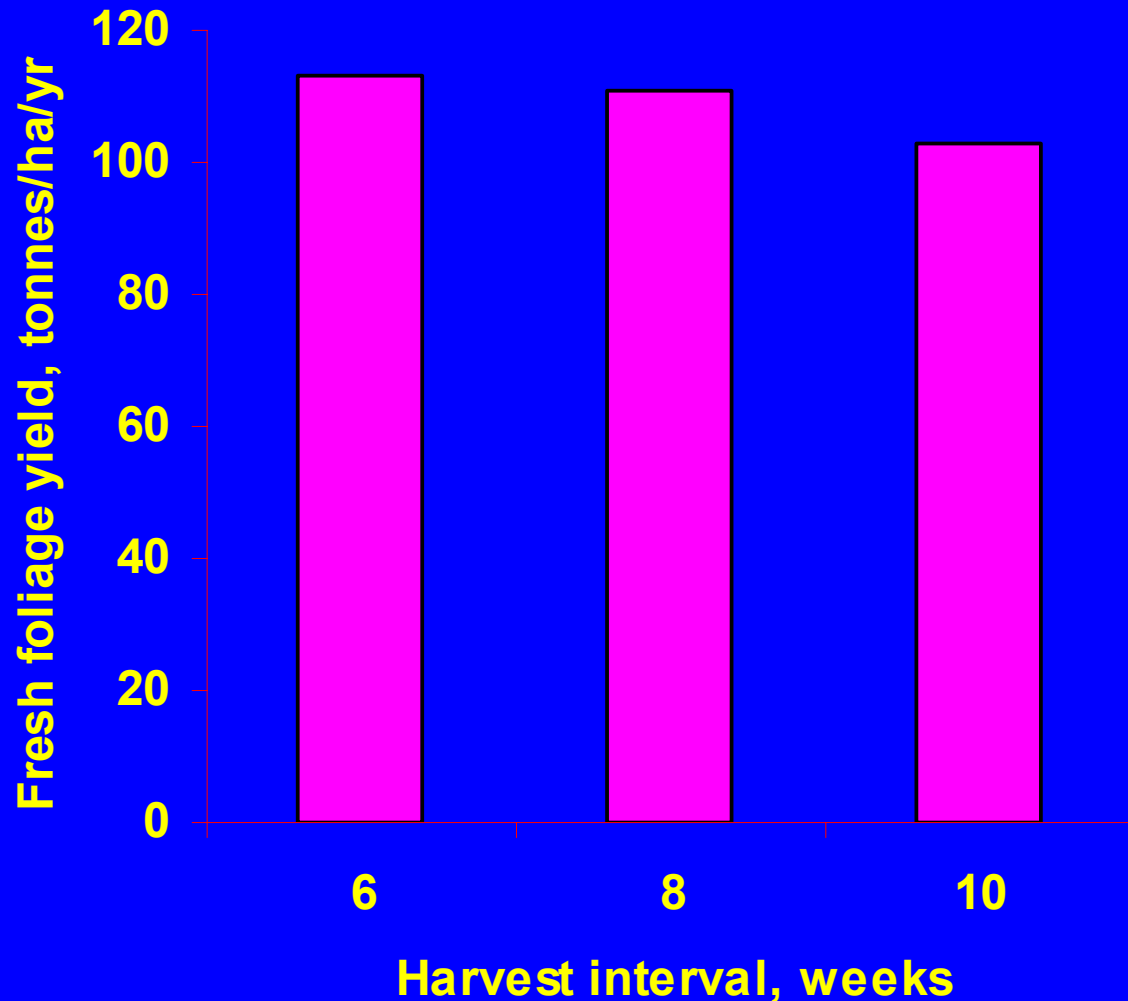
Production of foliage from cassava managed as perennial shrub (Cambodia)



Forage yield from cassava (origin Kampong Cham)

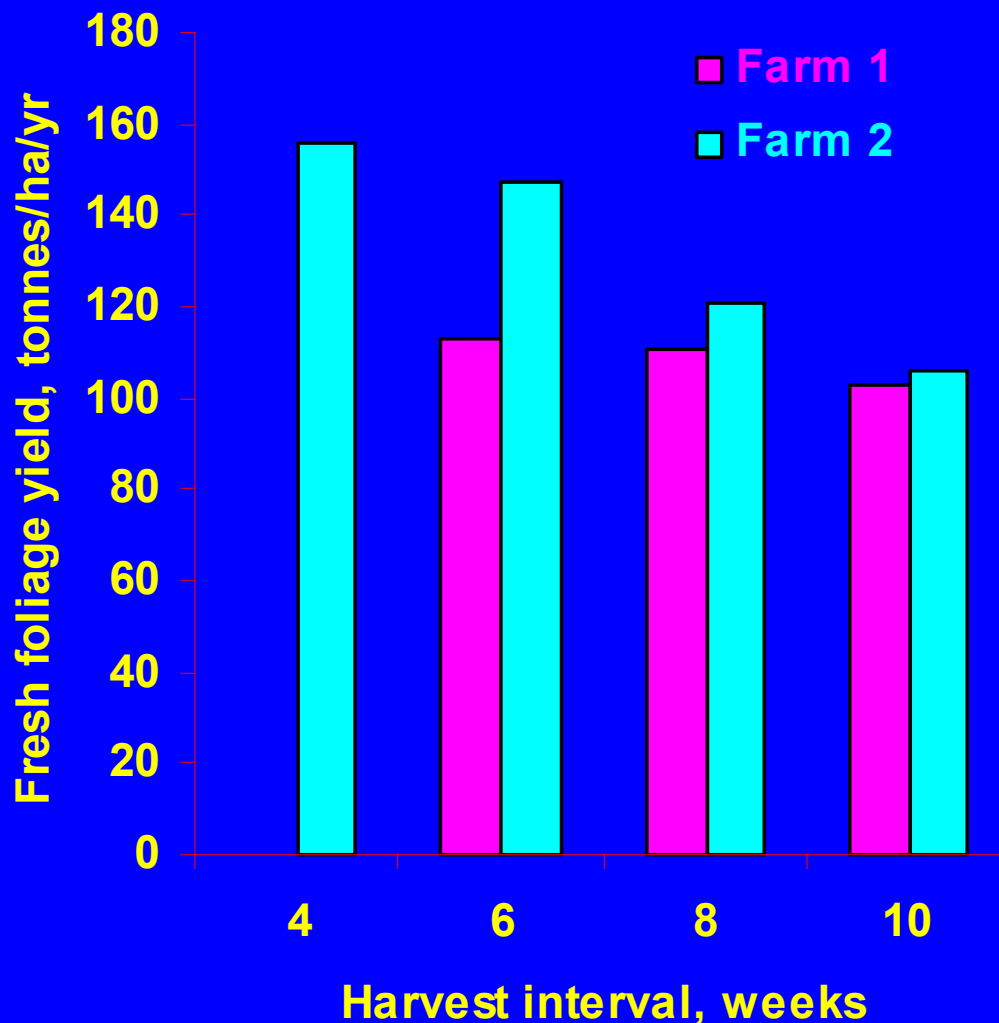


Harvest interval and yield of cassava in Colombia

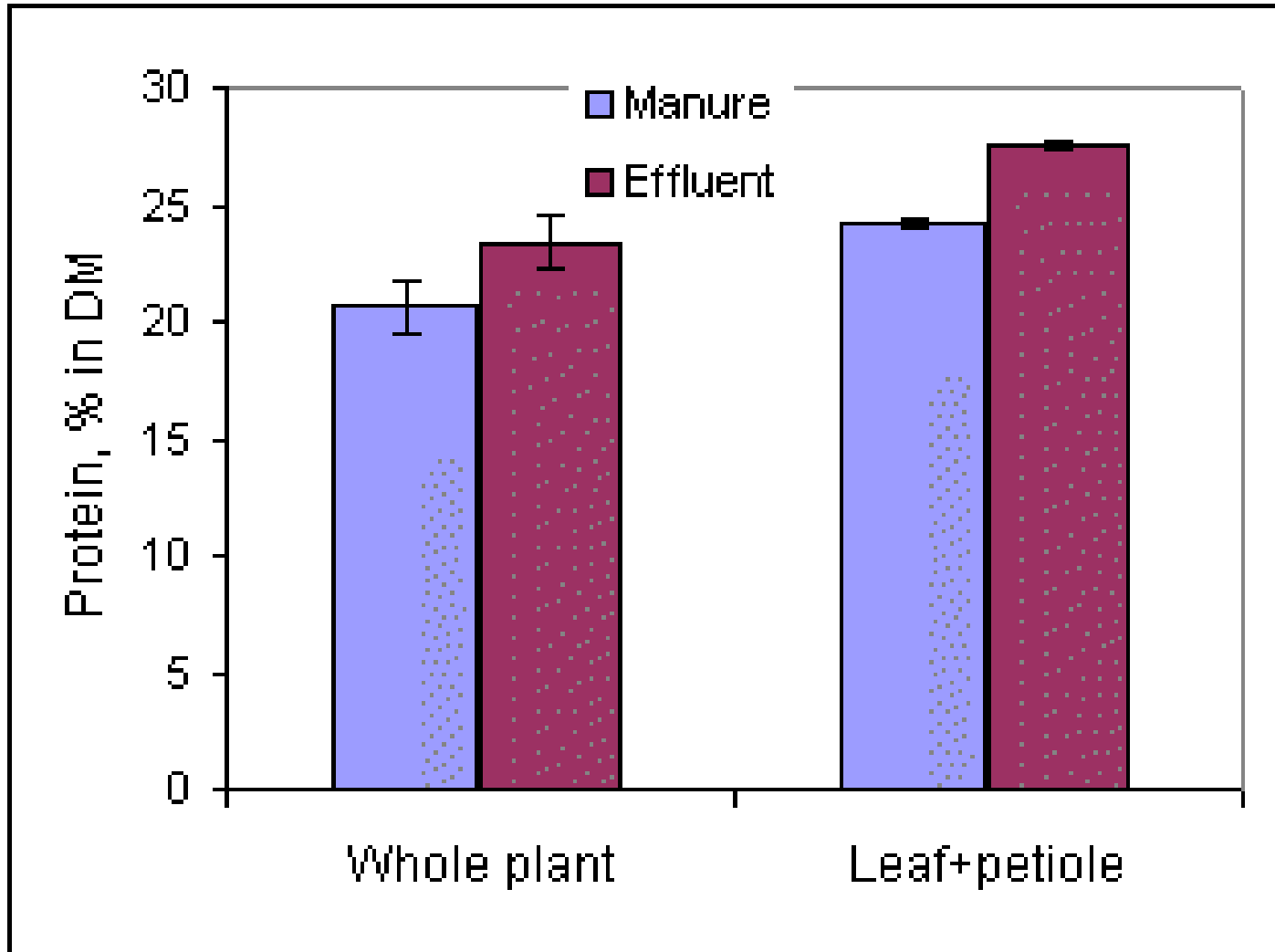


Source: Hernando Castro CORPOICA 2002

Harvest interval and yield of cassava on farms in Colombia



Biodigester effluent is better than fresh manure as fertilizer for cassava (Le Ha Chau 1998)



**Cassava as
protein-rich forage
(6 times more
protein/ha
than soya)**

**Preparing to ensile the leaves for
pigs**



Ready for harvesting

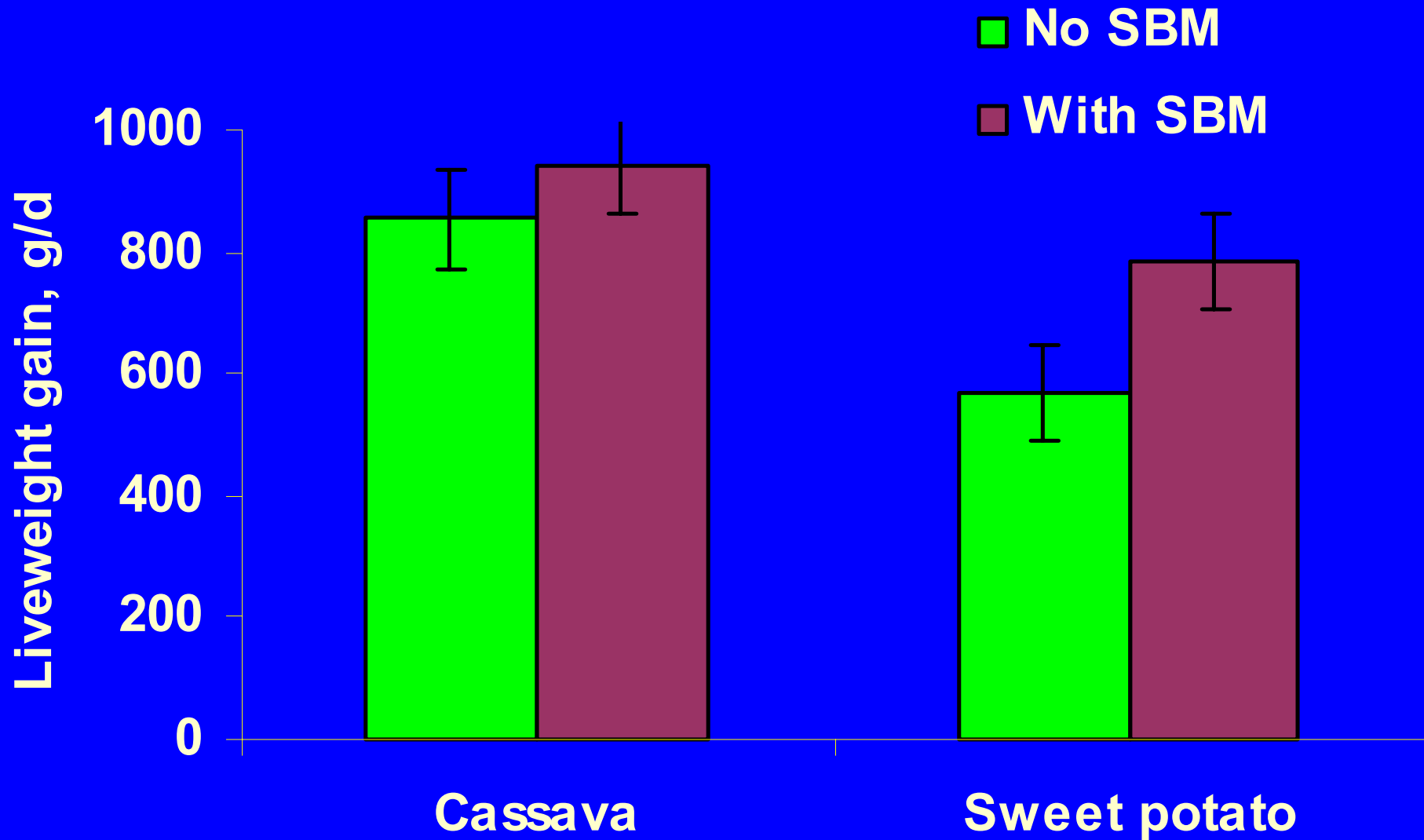


Feeding the fresh foliage to goats

Cassava foliage as livestock feed

- **As replacement for soya
bean meal for cattle
fattened on molasses/urea
(Dominican Republic 1978)**

Cassava or sweet potato as only forage in molasses/urea diets for fattening cattle

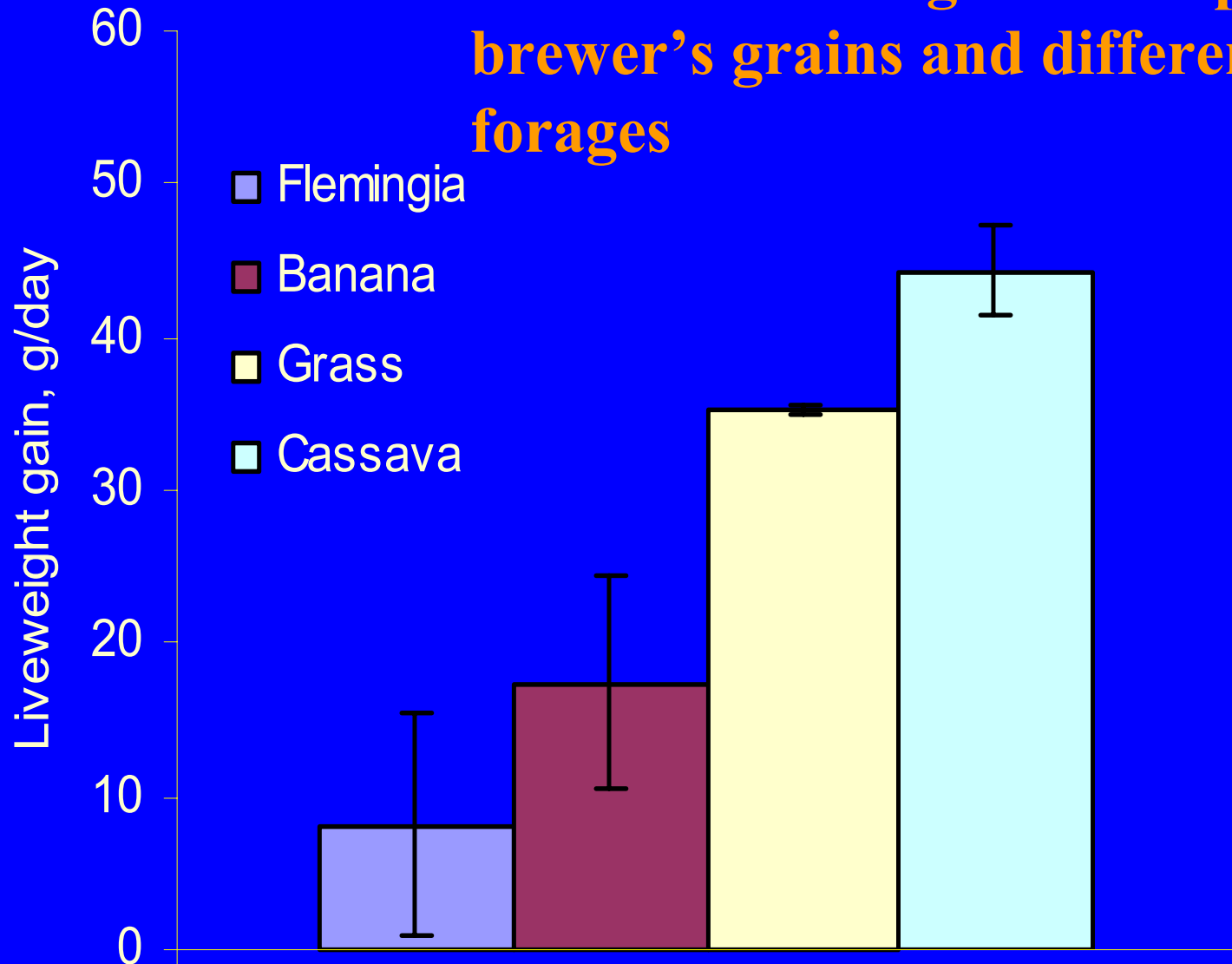


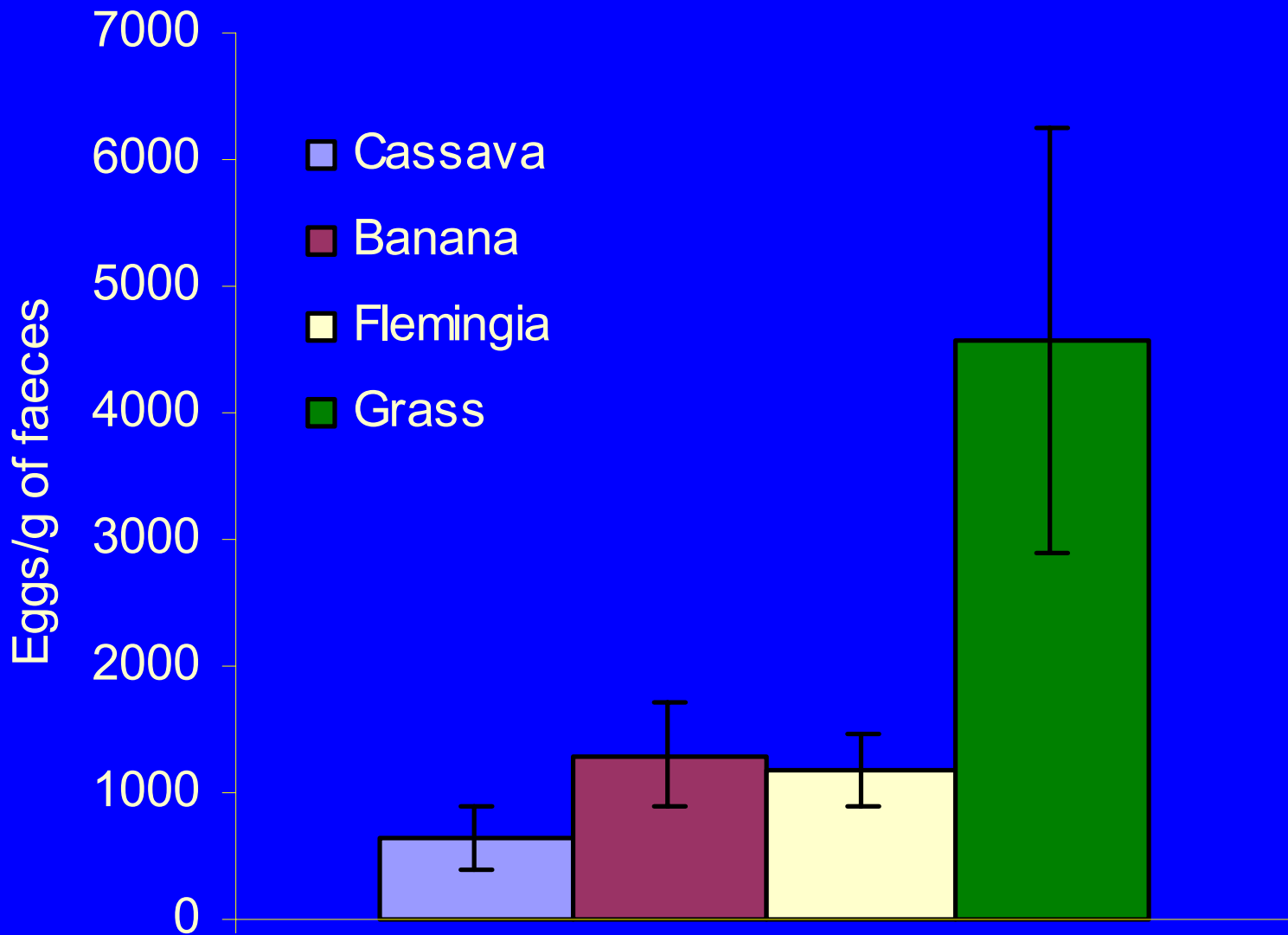
Source: Ffoulkes and Preston 1978

Cassava foliage for goats

- **As a protein supplement**
- **Control of intestinal nematodes**

Growth rates of goats fed spent brewer's grains and different forages





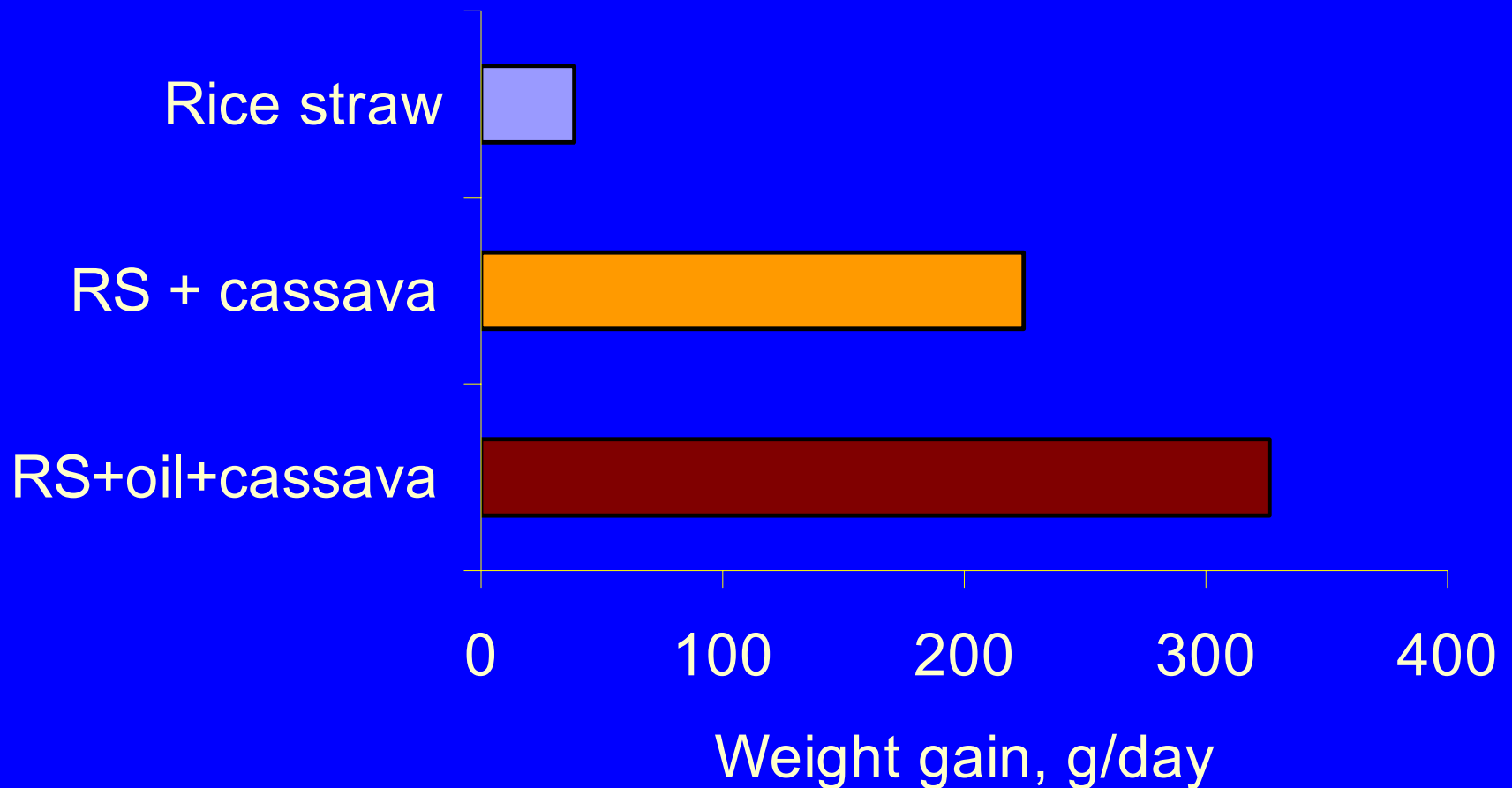
**Effect of tree foliages on
nematode infestation in goats**

Cassava foliage to supplement rice straw for fattening cattle

- Rice straw (RS) ad libitum + 300 g/day rumen supplement (13% urea+ minerals)
- RS plus fresh cassava foliage (CF) (3 kg/100 kg Live weight)
- RS + CF + oil single oil drench (5 ml/kg live weight)



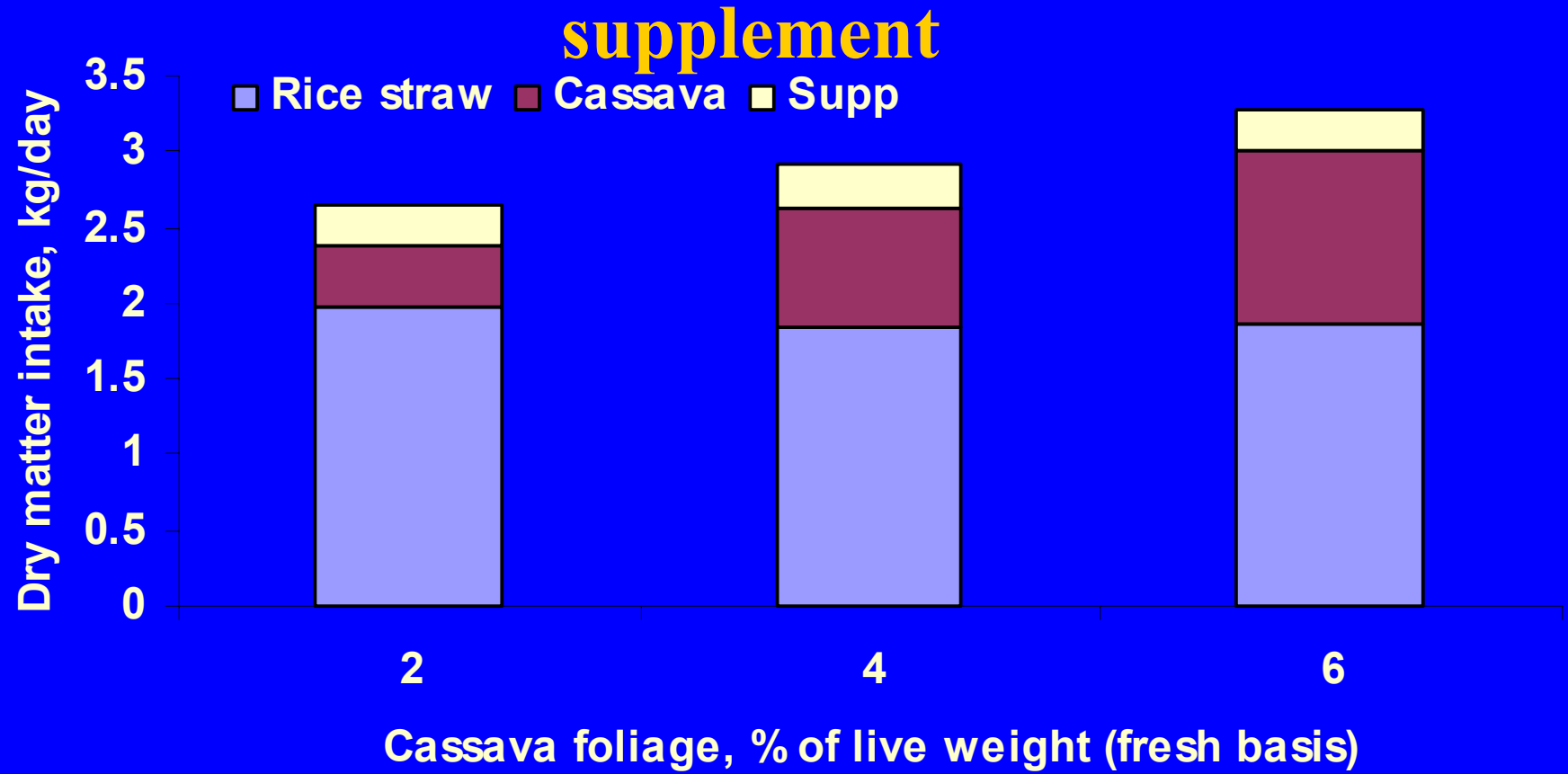
Supplementing rice straw with cassava foliage
and a single oil drench for local cattle in
Cambodia (all had urea-minerals)



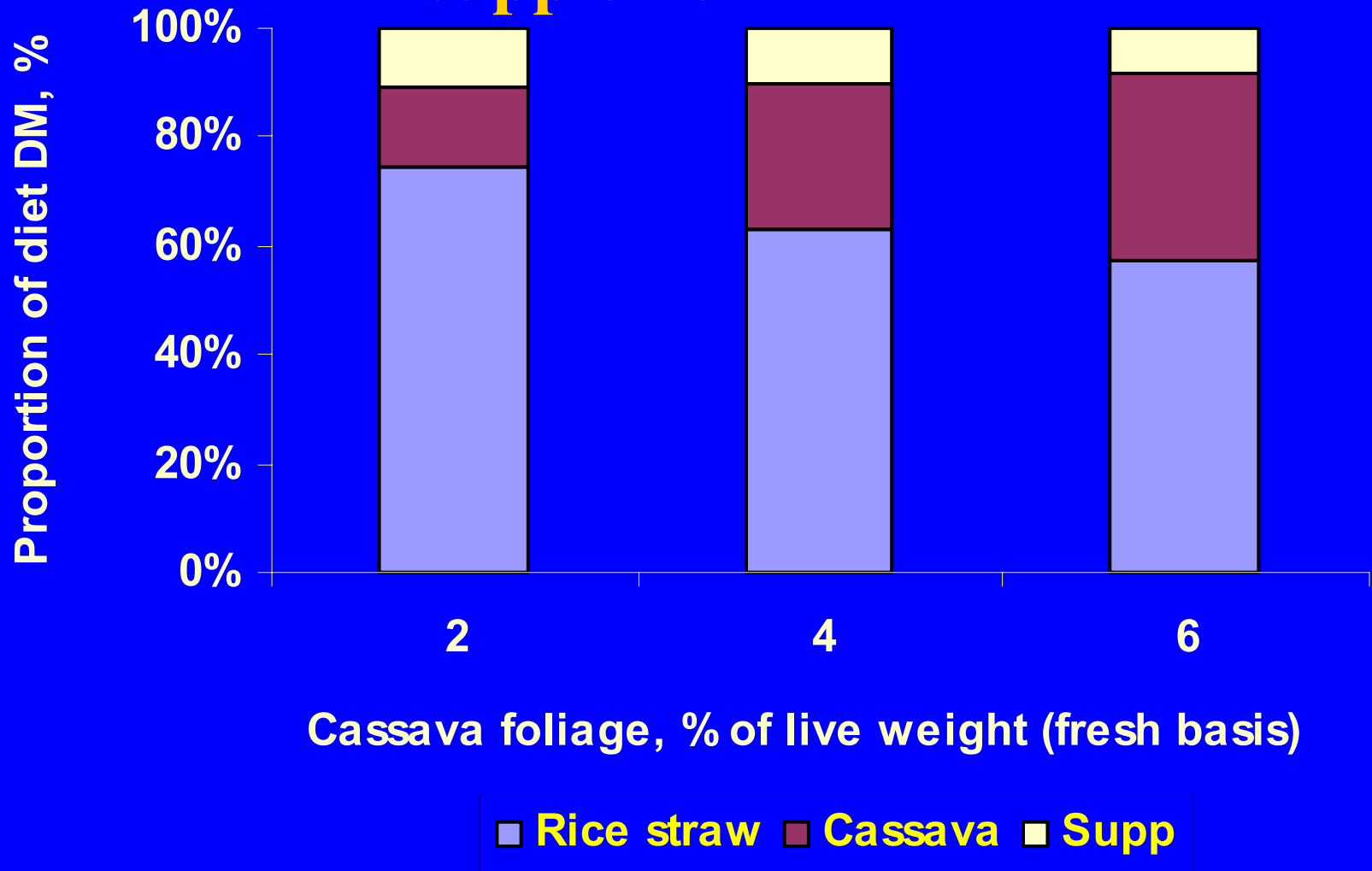
Growth response to fresh cassava foliage of local cattle fed rice straw

- **Rice straw offered at twice the expected intake**
- **Rumen supplement (13% urea + minerals) at 300 g/day**
- **Fresh cassava foliage at 2, 4 or 6 kg / 100 kg live weight**
- **Chinese yellow and Zebu crossbreds (110 kg live weight)**

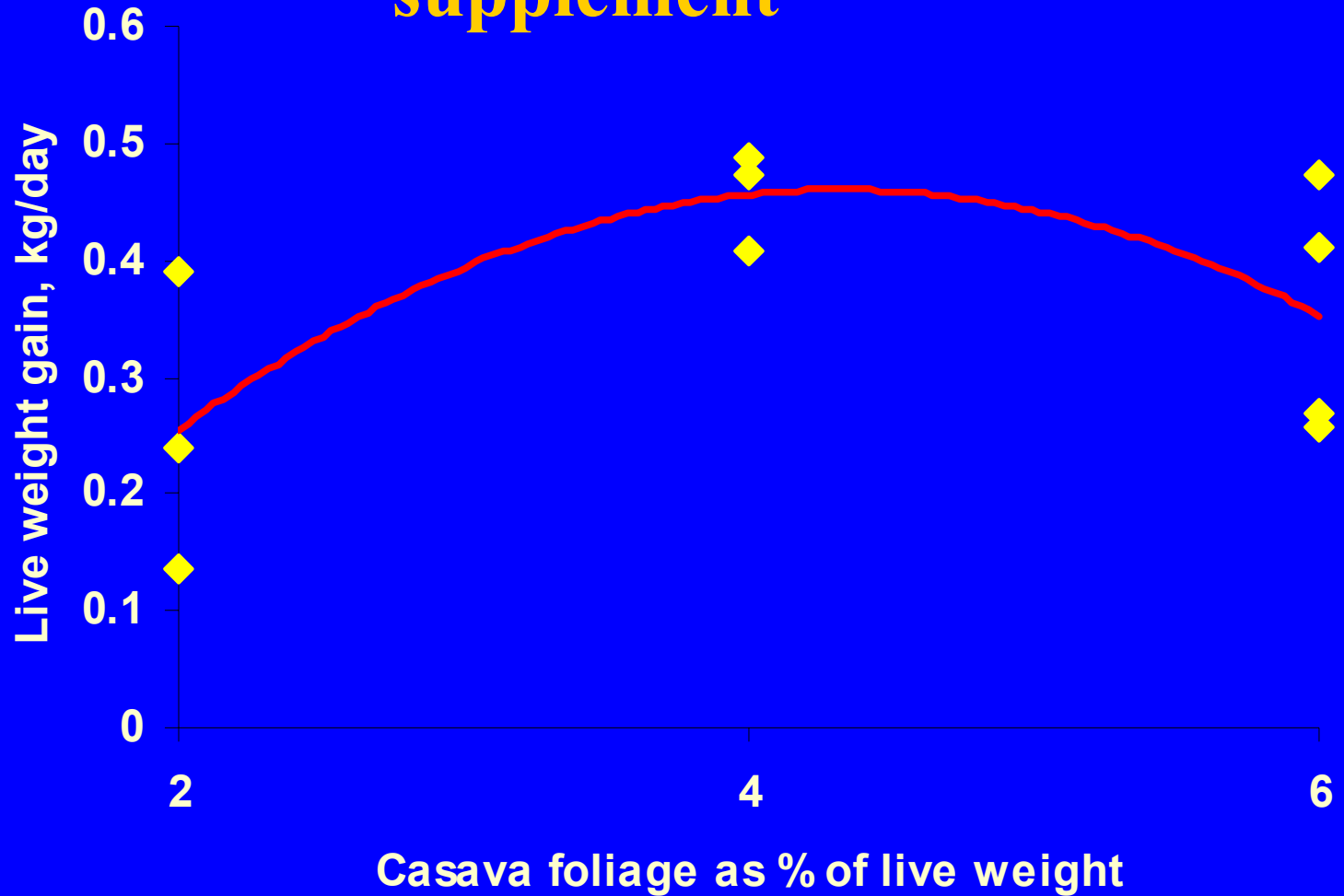
Effect of fresh cassava foliage on feed intake of cattle fed rice straw and a rumen supplement



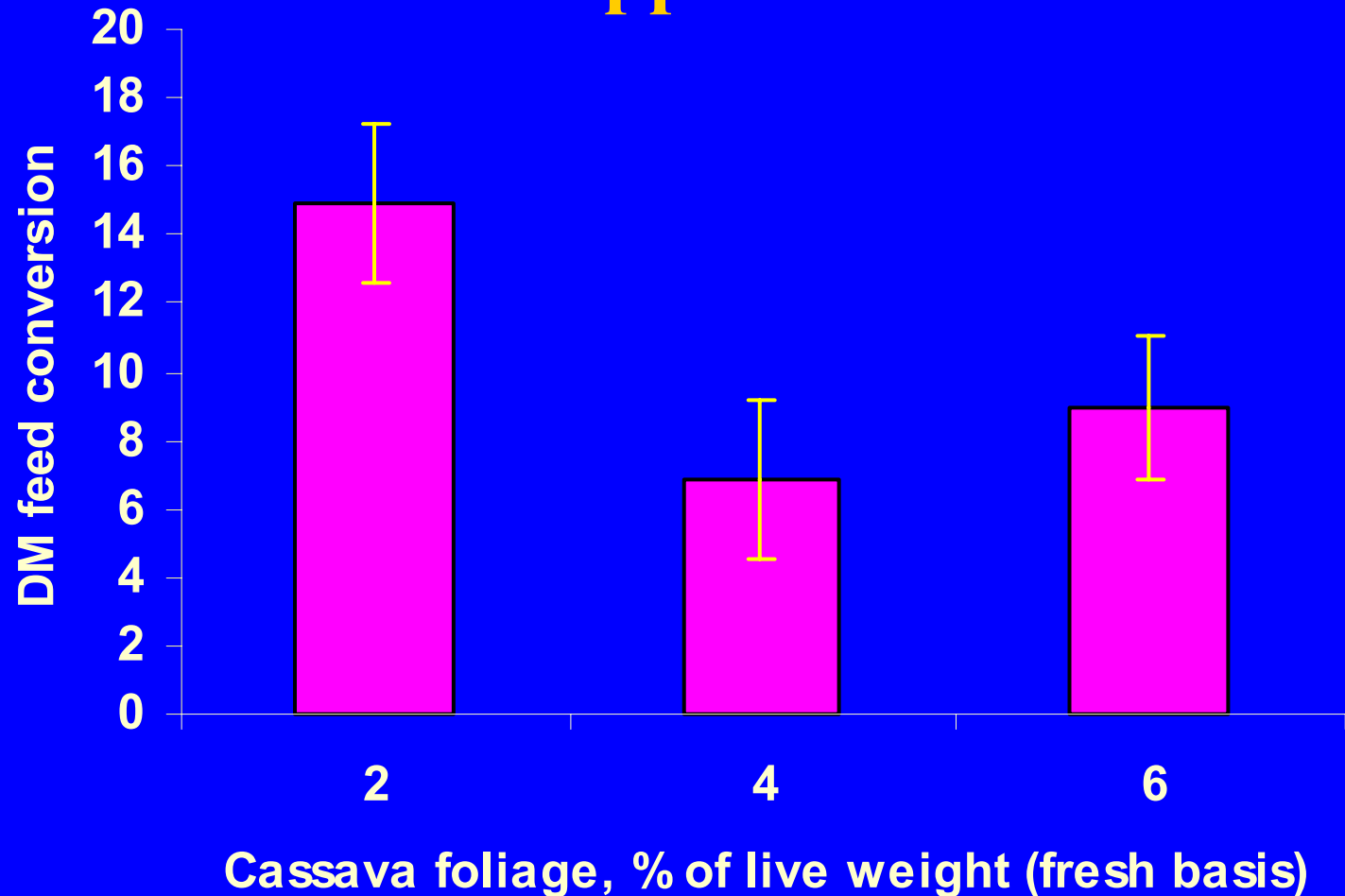
Effect of fresh cassava foliage on feed intake of cattle fed rice straw and a rumen supplement



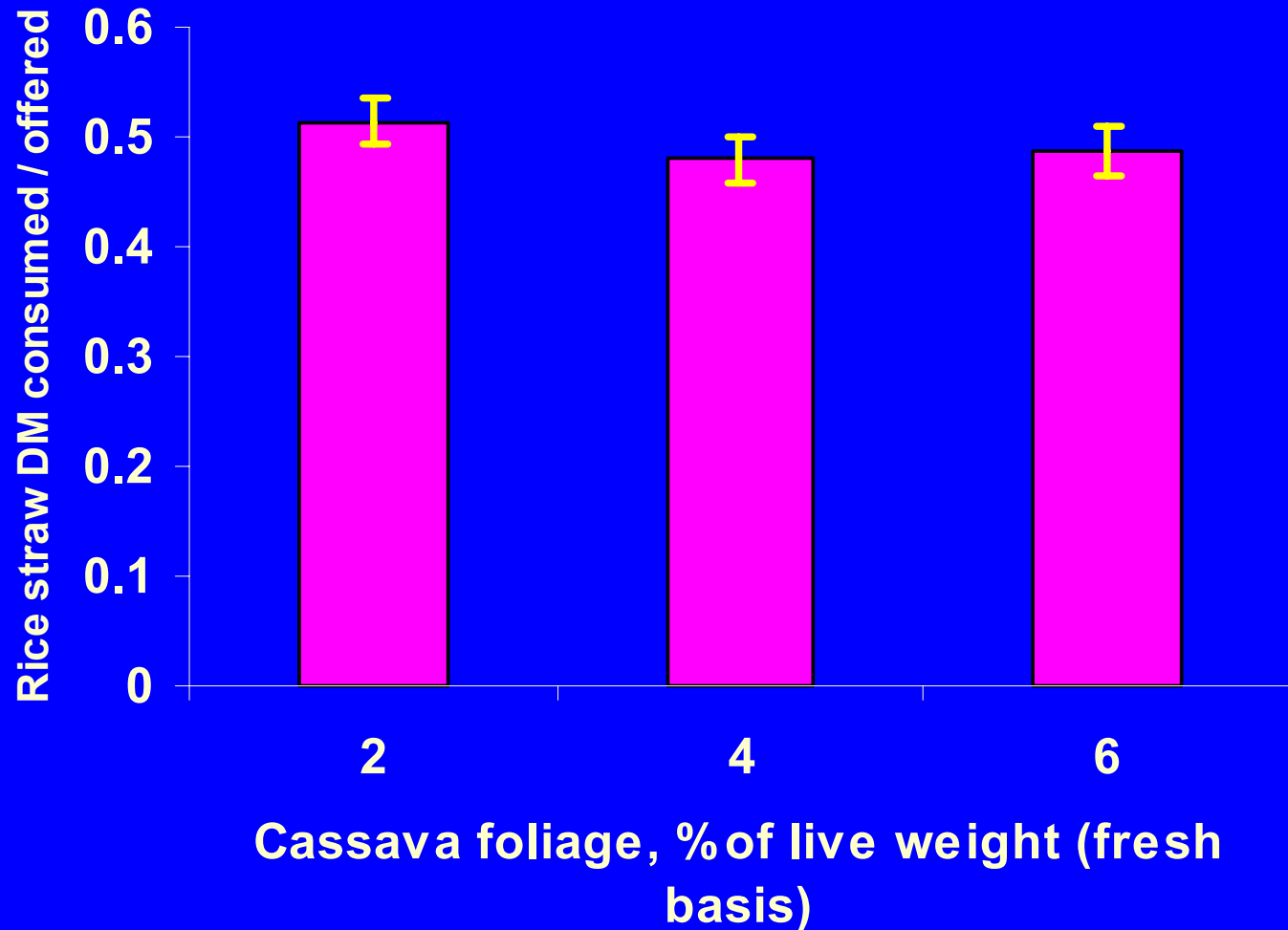
Growth response to fresh cassava foliage of local cattle fed rice straw and a rumen supplement



Effect of fresh cassava foliage on feed conversion of cattle fed rice straw and a rumen supplement



Effect of fresh cassava foliage on selection of rice straw by cattle



Ensiled cassava leaves as protein source for pigs

- **Wilting (12 hr in the sun)**
- **Add 5% molasses / palm syrup**
- **Store for 42 days**

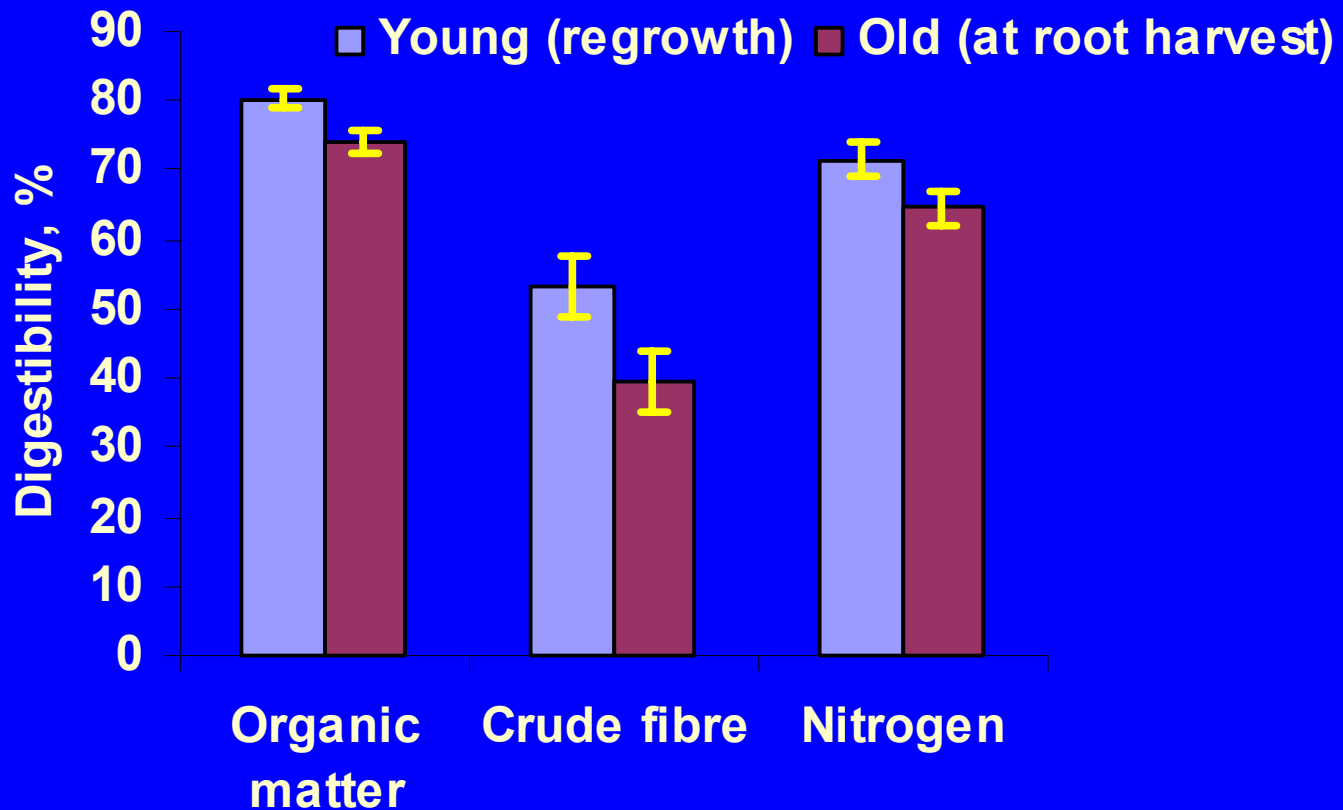
Composition of ensiled leaves from young or old cassava

	Young	Old
pH	3.93	4.00
DM, %	38.5	34.7
NDF, % in DM	25.5	23.5
N*6.25, % in DM	24.5	23.6
HCN, mg/kg DM	200	98

Composition of diets (% DM basis)

Ensiled cassava leaves	45
Palm oil	15
Broken rice	32
Dried fish	6
Minerals/vitamins	2

Digestibility by pigs of diets with 45% ensiled leaves (in DM) from old or young cassava)





Cassava as a semi-perennial forage

- **Flexible management**
- **Capacity to utilize high levels of organic manure in integrated farming system**
- **Resistant to most pests and diseases**
- **High nutritive value for cattle, goats, pigs**
- **HCN not a problem**

**Thank you for your
attention**

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