

Potential applications of amino acids supplementation for captive breeding of cervids in Southeast Asia



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Introduction

Deer farming is a thriving industry for venison, trophy hunting, and especially velvet antler as oriental traditional medicine in Southeast Asia. Feeding and nutrition are important for improving production performance, especially protein and amino acids (AA). Feeding protein and AA in tropical climate is challenging because of hot environments. Therefore, improving AA balance via supplementary feeding can be an effective alternative to fulfil protein requirements in tropical climate. Despite, the importance and the potential of AA in cervid nutrition, it is still very limited compared to other ruminant livestock, especially in tropical climate.

Deer utilization



Venison

- Market value of over \$1.5B USB.
- New Zealand (NZ)- top producer.
- High quality meat (high iron, polyunsaturated fatty acids, protein & low in cholesterol).
(Kudrnáčová et al. 2018; Bureš et al. 2020)



Velvet antlers

- NZ is main producer (slices and frozen export to Asian markets).
- Traditional medicines (Chinese, Korean, Japanese, Vietnamese, Taiwanese etc.).
- Improved by good feeding, welfare, breeding managements.



Trophy hunting

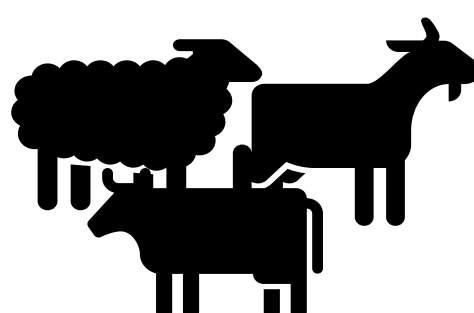
- Antlers for trophy.
- Hunting stags.
- Hunted venison (main producer- Spain).



Conservation & eco-tourism

- Enclosure breeding for conservation species.
- Deer parks, zoos.
- Eco-tourism related incomes for local (services).

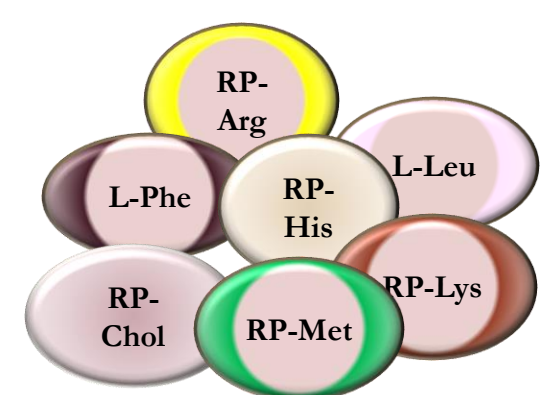
Why amino acids supplementation?



cattle
sheep
goats



Improved



+AA
supplementation

Nutrient intake,
digestion, utilization

Growth, BW, body
condition

Reproductive
performance

Carcass yield & meat
quality

Potential for



Studies in deer:
Mendoza-Nazar et al. (2012) ;
Huang et al. (2015a,b); Ceacero
et al. (2020); Ny et al. (2020) Si et
al. (2021a,b) (*RP-Lys, RP-Met,
RP-Arg).

Potential for



Studies in deer:
Kudrnáčová et al. (2019);
Bureš et al. (2020)
(RP-Lys).

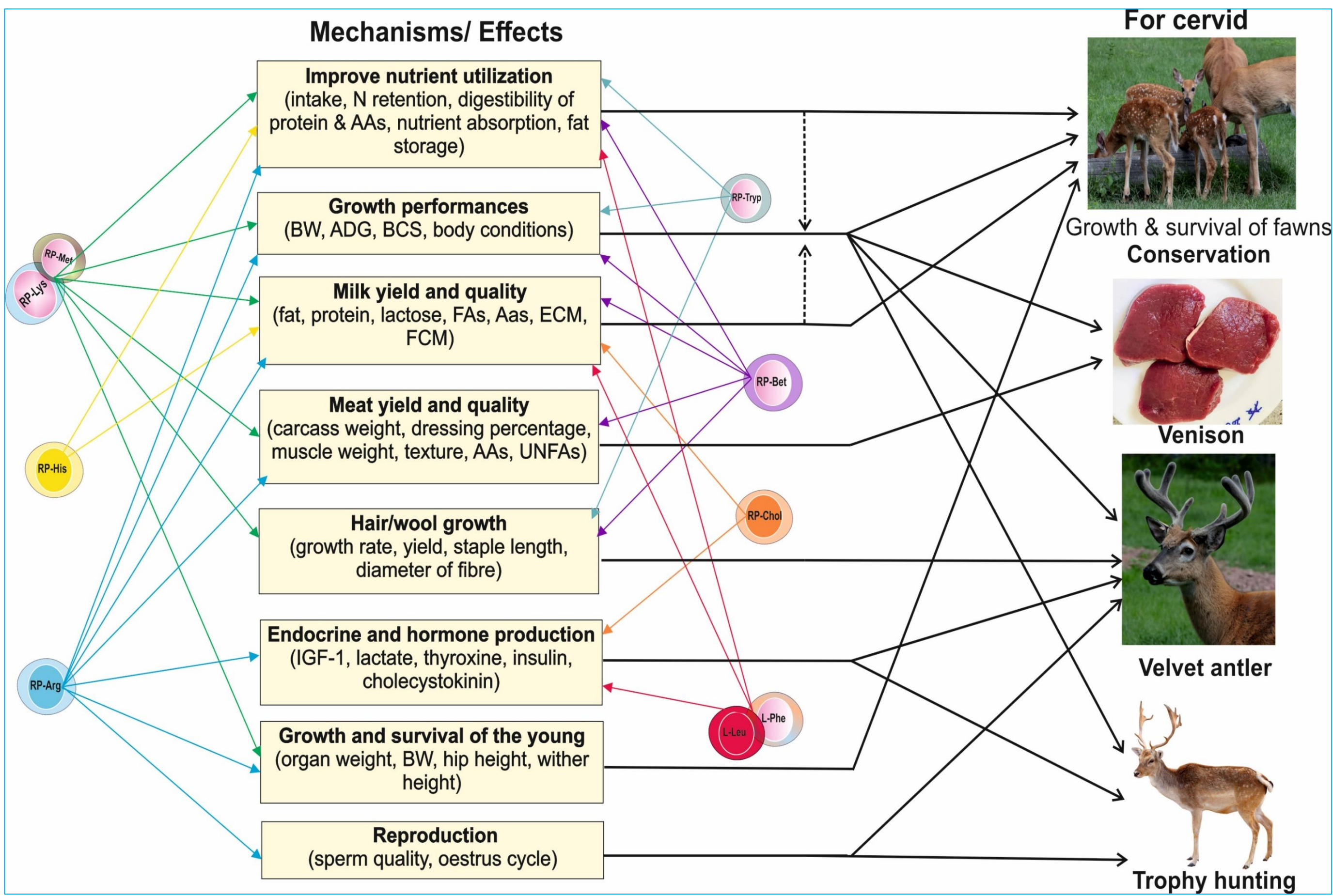
*RP- Ruminally Protected

Feeding protein to ruminants subtropic and tropics

- Hot climate → heat stress → decreased feed/nutrient intake
→ negative N-balance.
- Tropical forage low in digestible protein (fast lignification)
→ low N intake
→ depressed rumen microbe work & other nutrients utilization.
- Poor pasture management (unimproved grassland).
- Deficient essential nutrient supplements (minerals, AAs).
- Challenge to conserve forage during wet season to supplement during drying season:
 - Difficulty during processing (rain, muddy field, low stock density).
 - Costly process.
 - Loss of nutritive values (McDowell, 1985).

Therefore, amino acids supplementation is potential for improving feeding ruminant livestock and particularly on deer feeding management in tropics and subtropic conditions.

Potential effects of AAs from on deer production



Concluding remarks

- Only Lysine, Methionine, and Arginine have been supplemented in cervids.
- The AAs increased growth performance, velvet yield, meat quality, antler growth.
- Potential for improving venison, velvet or trophy antlers, and deer keeping for ecotourism or conservation purposes.
- The positive results are not always clear and thus it is not possible to recommend its generalised use, which would be probably economically unsustainable.
- The interesting effects are especially in animals fed low protein rations, and in growing animals with high nutritional demands.
- The AAs should be well- adjusted to the metabolic body weight, avoid winter feeding (avoid body fat stores).

Potential uses of AA supplementation in cervid nutrition, especially in tropical climate where protein feeding and feeding livestock are still big challenges.

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