**Research Positions in Peru**

**Research Project**

*‘Defining the most fit dairy cattle genetics for profitable, resilient and environment friendly high altitude Andean small-holder systems’* (A project funded by World Bank).

**Project background**

Accelerated climate change (CC) in the high Andean region makes crop production very risky; while small-holder dairying is becoming the most important activity, socio-economically. However, the productivity and profitability of the current dairy farming system is questionable. The high-altitude Andes has severe restrictions, both biotic (e.g., seasonality of forage production) and abiotic (accelerated CC, hypoxia, high UV radiation, etc.), for dairying. The animal genetics in use is that imported from systems dissimilar to those at the Andes. Severe altitude, thermal, nutritional and water stress result in low productivity and profitability, but extreme high intensity of environmental impacts, poor animal welfare and quality of life of farmers. Our work in the above described system has shown that rapid increases in profitability of up to 150%, with concomitant improvement of animal welfare and quality of life can be achieved with little or nil further investment. The producer-to-producer extension of good farming practices is used to create awareness and motivation for change. Motivated farmers apply first the easiest livestock management practices (systemic conception, records taking and management, body condition management, permanent provision of drinking water, rotational grazing on leafy pasture, increased grazing hours and reduction of hours in sheds). However, from this experience, it has been concluded that current unfit animal genetics is a factor that limits further progress. In addition to altitude, nutritional, cold and water stress (which imply extra energy cost), the large size of the animals (600-700 kg BW) implies that a high portion of consumption is used for maintenance and activity, leaving little for production and reproduction requirements. Large animals also affect pasture and soil by trampling and compaction. An animal genetics with superior productive and functional characteristics, demonstrated in the conditions of the high Andean environment, would facilitate the design of appropriate production systems. Here we propose to elucidate the characteristics of that ‘ideal’ animal by evaluating the effects of prevalent Andean factors on productivity and fertility, profitability, physiology, animal welfare and environmental impact of four genotypes of cattle (including Creoles) and alpacas (adapted to Andes). The information obtained will serve to recommend the most fit animal genetics (‘best bet’) and a technological proposal to improve dairy farming and at the same time propose a guaranteed conservation of the native genetic resources (camelids) and Creole cattle.

**Project objectives**

1. Determination of the effect of altitude and season on the energy expenditure of non-adapted species and species adapted to the high Andean ecosystem.
2. Quantification of voluntary consumption of organic matter, estimated metabolizable energy consumption, digestibility of OM, rumen passage rate and consumption of water in non-adapted species and species adapted to the high Andean ecosystem.
3. Quantification of the productive response influenced by altitude and cold stress and solar radiation stress in dry season in non-adapted species and species adapted to the high Andean ecosystem.
4. Determination of indicators of stress induced by altitude, cold and solar radiation stress and nutritional stress, in non-adapted species and species adapted to high Andean ecosystem.
5. Quantification of the intensity of enteric methane emission in non-adapted species and species adapted to the high Andean ecosystem.
6. Functional, physical-chemical and microbiological characterization of the ruminal ecosystem and C1 (first compartment of the stomach in alpacas) in non-adapted and adapted species to the high Andean ecosystem.
7. Genotyping of non-adapted species and species adapted to the high Andean ecosystem.
8. Evaluation of indicators and indexes of reproductive performance in non-adapted species and species adapted to the high Andean ecosystem.
9. Development and socialization of the systemic proposal to mitigate the effects of climate change and improve the resilience, productivity and sustainability of dairying and alpacas production systems in the high Andean ecosystem.

**Desired skills and experience:**

* We require three scientists with experience preferably in free-ranging livestock systems.
* PhD degree and 5 years overall research experience with supporting science publications.
* Desired experiences in either ruminant nutrition, energy metabolism, rumen function, animal stress, rumen microbiology or animal genetics.
* Awareness about small-holder livestock farming systems.
* Good interpersonal skills, knowledge of Spanish not strictly essential.
* Physically fit to spent most of the time at high altitude (3,700-4,200 masl).

**Conditions of employment:**

* Employment with Universidad Nacional Mayor de San Marcos, Peru
* Residence in Cusco, Peru
* Monthly salary of PEN 12,000 (~3,400 USD/month)
* A single relocation allowance of PEN 12,000 (~3,400 USD)
* No other monetary allowances
* Period of employment: 26 months, starting once international borders are open and travelling is safe.

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