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**B . E . D . I . M .**

**Bureau for Exchange and Distribution of  
Information on Minilivestock**

**Bureau pour l'Echange et la Distribution  
de l'Information sur le Mini-Elevage**

Semestrial Bulletin of Information  
on Minilivestock

Bulletin Semestriel d'Information  
sur le Mini-Elevage

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## **NOUVELLES DE L'ASSOCIATION**

**Le Conseil d'Administration et l'Assemblée Générale Ordinaire de l'association se sont réunis le 21 avril 2006. Les principaux éléments nouveaux qui ont été discutés concernent l'avenir du bulletin BEDIM et la création d'un site Internet nettement plus interactif avec les producteurs et techniciens en mini-élevage.**

**Au cours des 6 derniers mois, l'association a en effet reçu plus de 40 demandes par courriel et environ 10 demandes par courrier normal concernant des aspects techniques du mini-élevage, en particulier les guides techniques sur les différentes espèces animales. Une analyse du site Internet de BEDIM a également montré que celui-ci est visité à raison de 50 fois par jour pour charger des documents ou des informations.**

**Par rapport à cela, l'édition et l'envoi d'un Bulletin BEDIM coûtent environ 3 Euros par document et l'association ne dispose plus de l'aide financière de la FAO pour assurer ce travail. Par conséquent, le Conseil d'Administration a décidé de poursuivre l'édition du BEDIM sous la forme actuelle pour une dernière année. Cela fera, à la fin de l'année 2006, 15 ans que l'association publie le Bulletin deux fois par an et l'envoie à près de 600 correspondants.**

**Par contre, de manière à rencontrer les demandes croissantes au niveau du site Internet et les échanges par courriel entre le BEDIM et les personnes intéressées par le mini-élevage, le Conseil d'Administration a décidé de mettre en œuvre au cours des prochains mois un site Internet nettement plus dynamique et complet. Celui-ci serait plus fréquemment remis à jour. Il comprendrait toujours des références bibliographiques récentes, les Bulletins BEDIM jusqu'au numéro 15, etc., mais il serait davantage orienté vers des échanges et des informations techniques. Parmi celles-ci, il pourrait y avoir par exemple des actualités concernant des projets de recherche ou de développement et l'édition d'articles de vulgarisation et d'ouvrages, des liens avec les experts sur les différentes espèces relevant du mini-élevage et un forum de discussion au sein duquel chacun pourra échanger, poser des questions, etc.**

**Par ailleurs, le Conseil d'Administration a également décidé d'étudier la possibilité d'améliorer, et si possible de compléter, les guides techniques qui figurent sur le site actuel. Un appel à des spécialistes de bonne volonté sera d'ailleurs prochainement lancé dans ce sens.**

Grâce à cette nouvelle initiative, les personnes intéressées par le mini-élevage disposeront toujours d'une information en ce qui concerne l'évolution de la science dans ce domaine, mais le Conseil d'Administration du BEDIM espère que ce nouveau mode de communication profitera davantage aux techniciens et producteurs et, peut-être aussi, aux étudiants. Bien entendu, même si la communication par voie électronique sera largement développée dans le futur, des échanges par courrier postal resteront toujours possibles.

## **NEWS OF THE ASSOCIATION**

The Board of Trustees and the Ordinary General Assembly of the Association met on April 21, 2006. New key issues discussed concerned the future of the BEDIM Bulletin and the creation of a website quite more interactive with producers and technicians in mini-livestock.

Over the last 6 months, the association indeed received more than 40 requests by e-mail and about 10 others by usual mail regarding the technical aspects of mini-livestock, in particular technical guides on different animal species. An analysis of the BEDIM website showed also that it is visited up to 50 times a day to download some documents and information.

In relation to this, editing and distribution of the BEDIM Bulletin cost about 3 euros by document and the association has no more financial assistance from FAO to ensure the work. Therefore, the Board of Trustees decided to pursue editing BEDIM in its current form up to one year. That will make, by the end of 2006, 15 years that the Association publishes the Bulletin twice a year and sends it to nearly 600 correspondents. However, in order to meet the increasing requests at the website and electronic exchanges between BEDIM and people interested in mini-livestock, the Board of Trustees decided to set up over the upcoming months a website quite more dynamic and complete. This would be more frequently updated. It would always contain recent literature references, BEDIM Bulletins up to no. 15, and so on, but it would be much more oriented towards exchanges and technical information.

Among these, there could be for instance actualities over research or development projects and editing of extension articles and books, over the links with experts in the different mini-livestock species and a forum of discussion in which everyone could exchange, ask questions, etc.

Likewise, the Board of Trustees also decided to study the possibility of improving, and if possible, completing the technical guides present on the current website. Hence, a call to some specialists of good will be issued soon to this aim.

Thanks to this new initiative, people interested in the mini-livestock will always access information regarding the scientific evolution in this area, but the BEDIM Board of Trustees hopes that this new communication mode will benefit the more to technicians and producers and, perhaps, to students. Of course,

even if the communication by electronic way shall be extensively developed in the future, exchanges through post mails will always remain possible.

\* \* \*

## **ACTUALITES**

### **LES ASTICOTS REPRENENT DU SERVICE MEDICAL**

(D'après Marie France Coutu, Réseau Proteus, 2004  
<http://www.reseauproteus.net/fr/Actualités>)

Cette actualité qui date du 9 novembre 2004 indique qu'il semble y avoir un regain d'intérêt pour l'utilisation thérapeutique des asticots, car un chirurgien japonais a utilisé avec succès des asticots sur des lésions des pieds de ses patients diabétiques, pour qui l'amputation était imminente. Aux Etats-Unis, l'Agence de contrôle des médicaments a récemment approuvé l'usage médical de ces larves, même si l'idée est peut ragoûtante.

L'utilisation des asticots pour soigner des plaies remonterait au XVI<sup>e</sup> siècle. Les autochtones de l'Australie et de l'Amérique connaissaient bien l'effet cicatrisant des larves de mouches. Durant la première guerre mondiale, les soldats dont les blessures étaient infestées d'asticots guérissaient plus rapidement et en plus grand nombre que ceux soumis aux soins médicaux classiques de l'époque.

La thérapie au moyen d'asticots consiste à déposer des larves de mouches vertes, cultivées en milieu stérile, sur une plaie recouverte d'une gaze aérée et de les remplacer au bout de 3 à 4 jours. Les larves dévorent les peux mortes infectées en laissant les tissus sains intacts. Elles sécrèteraient aussi une substance désinfectante.

Il semblerait que, suite aux résistances aux antibiotiques, les autorités médicales se tourneraient de plus en plus vers cette technique pour le traitement des plaies récalcitrantes.

Depuis quelques années déjà, on voit également apparaître plusieurs articles sur le sujet, notamment en consultant le Web avec des mots clés tels que "Maggot" associé à "Biotherapy" ou "Therapy".

\* \* \*

## PUBLICATIONS

### AULACODICULTURE : SUPPORTS DE FORMATION

Pourquoi pas l'aulacode? Boîte à outils de l'éleveur et du formateur (CIRAD)

Le projet Dabac (Développement d'Alternatives au Braconnage en Afrique Centrale), financé par l'Union Européenne, vise principalement l'étude des filières de viande de brousse et la diffusion de l'aulacodiculture (*Thrionomys swinderianus*) dans trois régions d'Afrique Centrale (Gabon, Cameroun, République Démocratique du Congo).

C'est dans ce cadre qu'il a réalisé, en collaboration avec le CIRAD, une série d'outils didactiques destinés à la formation des éleveurs d'aulacodes. Cette « boîte à outils » comprend un manuel de l'éleveur, un manuel du formateur, les transparents de la formation et un double album DVD-CD Rom accompagné d'un livret introductif.

Le tout est réuni dans une valisette à usage de toute structure apte à dispenser des formations en aulacodiculture.

Sont ainsi capitalisées plus de 10 années d'expérience en recherche-action et en formation, acquise à la station d'élevage de gibier d'Owendo (Libreville, Gabon) dans le cadre du projet Dabac, de 2002 à 2004, ainsi que les projets antérieurs mis en œuvre depuis 1994 par l'ONG Vétérinaires Sans Frontières.

#### *Manuel de l'éleveur*

Le manuel de l'éleveur (124 pages), largement illustré et très didactique comprend les chapitres suivants :

- introduction à l'aulacodiculture
- constructions
- alimentation
- conduite de l'élevage
- reproduction
- maladies et soins
- gestion de l'élevage.

Chaque point est traité de manière approfondie et extrêmement pratique afin de permettre aux éleveurs d'appréhender les connaissances, contraintes et compétences nécessaires pour mener à bien une exploitation rentable en adéquation avec les besoins et comportements spécifiques de l'aulacode en milieu d'élevage.

***Le manuel du formateur***

Découpé en six journées soit six modules de formation correspondant aux chapitres précités, le manuel du formateur privilégie l'apprentissage selon des méthodes actives et reprend en détail le parcours pédagogique: référentiel de formation, échanges préalables, contenu de cours, utilisation des supports, questions, fiches d'exercices et d'évaluation.

***Livret introductif***

Le livret introductif présente en quelques pages la problématique du braconnage en Afrique Centrale, le projet Dabac et les alternatives proposées à la consommation de viande de brousse.

***DVD***

Le DVD contient un film d'une durée de 122 minutes, tourné à la station d'élevage d'Owendo (Gabon), qui illustre en onze chapitres, de manière vivante et humoristique, tous les aspects de l'aulacodiculture. Deux annexes décrivent les affections spéciales et la castration.

***CD ROM***

Le CD ROM comprend :

- la boîte à outils numérique
- un aperçu du site internet du Dabac
- une enquête sur la filière des viandes de brousse
- une bibliothèque

La boîte à outils numérique reprend les manuels du formateur et de l'éleveur en format PDF, une photothèque thématique, les transparents de la formation au format PDF et Power Point.

La présentation de l'enquête sur la commercialisation et la consommation des viandes de brousse comprend les trois fichiers suivants :

- Edderai D., Houben P., Tadenvoc Y., Dame M., Ntsame M., Cornelis D., Pocard-Chapuis R. Présentation d'une méthodologie d'étude du commerce et de la consommation des viandes de brousse dans les grandes villes d'Afrique par une approche multicentrique. Actes du 6eme symposium international sur l'utilisation de la faune sauvage (Paris 2004). Rev. Game and Wildlife Science, 2005.
- Edderai, D. Houben, P., Dame, M. Tadenvoc, Y. Ntsame M., Cornélis, D., Pocard-Chapuis, P. 2004. La viande de gibier dans l'alimentation des villes en Afrique : importance et organisation du commerce. Cas de Libreville et Yaoundé. 6th International Wildlife Ranching Symposium, Paris.

- Ménard, C., Chavernac, D., Lamic, N., Cornélis, D., 2004. Base de données de l'enquête sur la consommation des viandes de brousse (Access).

La bibliothèque est un panel d'articles et travaux produits par le projet Dabac et d'autres études ou projets relatifs à l'aulacodiculture, les gibiers et les filières de viande de brousse en Afrique Centrale. Elle est fort riche et mérite d'être acquise par tous les professionnels intéressés a ce secteur.

Si la valisette n'a été diffusée qu'en un nombre restreint d'exemplaires, les outils qu'elle contient existent tous en version électronique sur le CD Rom. Pour plus renseignements notamment sur leur disponibilité, contacter le CIRAD:

CIRAD/ U.R. 22 « Gestion Intégrée de la faune »  
Département Elevage et Médecine Vétérinaire  
Campus International de Baillarguet TA 30/E  
34398 Montpellier cedex 5, France

Personnes de contact : [danielcornelis@cirad.fr](mailto:danielcornelis@cirad.fr), [francois.monicat@cirad.fr](mailto:francois.monicat@cirad.fr)

Site web: [www.cirad.fr](http://www.cirad.fr)

**ROLE OF URBAN AND PERI-URBAN LIVESTOCK PRODUCTION IN  
POVERTY ALLEVIATION AND FOOD SECURITY IN AFRICA**

(112 pp. ,14 fig., 14 tab., 2006) - 12,50 €

Par Eric Thys

Académie Royale des Sciences d'Outre-Mer  
Classes des Sciences naturelles et médicales,  
Mémoire in-8, Nouvelle Série, Tome 26, fsc. 1, Bruxelles, 2006

Ce livre rédigé en anglais met bien en relief l'importance et la spécificité de l'élevage dans le développement de l'agriculture, la sécurité alimentaire et la réduction de la pauvreté en milieux urbains et périurbains africains. Toutes les problématiques qui y sont abordées concernent l'élevage en général, mais aussi le mini-élevage.

Les caractéristiques générales de l'agriculture urbaine, puis celles relatives à l'élevage en rapport avec des aspects socio-économiques et les problèmes que celui-ci suscite, sont d'abord présentés. La suite de l'ouvrage est consacrée à des études de cas concrètes. Dans les derniers chapitres, l'auteur discute de manière détaillée les différents aspects techniques, sociologiques, économiques, environnementaux et politiques relatifs aux élevages urbains, puis fournit des recommandations finales.

Ce livre doit intéresser les décideurs politiques, les techniciens du développement, les enseignants, les étudiants et pour toute personne intéressée par le sujet.

Pour plus d'information et commande (notamment via le Web)

**Académie Royale des Sciences d'Outre-Mer**

**Rue Defacqz 1 boîte 3**

**1 000 Bruxelles**

**E-mail : [kaowarsom@skynet.be](mailto:kaowarsom@skynet.be)**

**Web : <http://www.kaowarsom.be>**

(voir également le résumé du livre sous la rubrique MINILIVESTOCK)

**L'ELEVAGE DU SANGLIER DE RACE PURE**

**Par Pinet J.M.**

**Adeprina Editions. 2005, 169 pp, en français**

**Association pour le Développement de l'Enseignement, du Perfectionnement et de la Recherche à l'Institut National Agronomique Paris-Grignon, 16 rue Claude Bernard, 75231 Paris, France**

**E-mail : [jm.pinet@adeprina.fr](mailto:jm.pinet@adeprina.fr)**

**Ce livre constitue une référence sur l'élevage des sangliers en Europe, pour lequel peu d'informations existent. Le manuel est exhaustif et représente le seul ouvrage complet sur les sangliers élevés en race pure en France. Ecrit par le président de l'association sur l'élevage de sanglier, l'ouvrage s'adresse aux exploitants, mais aussi à un plus large public. Il aborde les techniques classiques d'élevage du sanglier telles que la reproduction, la santé des animaux et l'alimentation. Il fournit toutefois aussi des aspects très pratiques, peu communs dans les manuels classiques, et légaux en vue de démarrer un élevage en France. Une attention particulière est aussi dédiée à la génétique des sangliers et aux aspects économiques ainsi qu'à la rentabilité de cet élevage en comparaison avec d'autres espèces. Enfin, l'ouvrage fournit des informations sur le statut de l'élevage des sangliers et la commercialisation de ses produits à l'échelle mondiale.**

## **NOVEDADES DE LA ASOCIACIÓN**

La Junta Directiva de la asociación se reunió el 21 de abril 2006 en Asamblea General Ordinaria. Se discutieron principalmente el futuro de BEDIM y la creación de un portal Internet más interactivo, para mejorar la comunicación entre productores y técnicos implicados en la mini-cría.

En el transcurso de los 6 últimos meses, la asociación ha recibido más de 40 solicitudes de información por correo electrónico y otras 10 por correo normal relativas a aspectos técnicos de la mini-cría, y en particular las guías técnicas sobre las diferentes especies. Un análisis del portal Web actual de BEDIM demuestra igualmente que recibe unas 50 visitas por día para descargar documentos o buscar información sobre la mini-cría.

Con relación a esta actividad, la edición y el envío del Boletín de BEDIM en versión papel cuesta unos 3 euros por documento y la asociación ya no dispone de la ayuda financiera de la FAO para garantizar esta actividad. Por tanto, la Junta Directiva ha decidido de mantener la edición de BEDIM en su versión actual durante este último año. En este sentido, a finales del año 2006, hará 15 años que la asociación publica el Boletín dos veces por año y lo reenvía a unos 600 lectores.

Sin embargo, con el objetivo de responder a las numerosas solicitudes recibidas y a una demanda creciente de información en Internet y por correo electrónico, la Junta Directiva ha decidido de desarrollar un portal Internet más dinámico y completo. Este será actualizado con mayor frecuencia. Contendrá informaciones bibliográficas recientes y los últimos boletines de BEDIM hasta el nº 15, etc., pero estará mayormente orientado hacia el intercambio de informaciones técnicas.

Entre las mismas, podemos imaginar por ejemplo la inclusión de novedades relativas a proyectos de investigación o desarrollo sobre diferentes especies, la edición de artículos de divulgación o de libros de referencia, links de contacto con expertos e renombre para cada especie, y foros de discusión en los cuales se puedan intercambiar experiencias y opiniones, discutir o efectuar preguntas a otros internautas..

Por otro lado, la Junta Directiva ha decidido que se estudiara la posibilidad de mejorar, y si fuera posible, completar, los manuales o guías técnicas que figuran en el Website actual. En este sentido, se lanzará próximamente una llamada a especialistas de buena voluntad con este fin.

Gracias a esta nueva iniciativa, las personas interesadas por la mini-cría dispondrán siempre de alguna información en lo que respecta la evolución de la ciencia en este ámbito. La Junta Directiva espera que esta nueva forma de comunicación sea más provechosa para técnicos y productores y tal vez también para estudiantes interesados en este sector. Lógicamente, a pesar de que la comunicación electrónica será ampliamente privilegiada y desarrollada en el futuro, el intercambio de información por correo se mantiene como otra opción posible.

## **SURVEY OF THE LITERATURE**

**BDB ref. :** Corresponds to the Identification code of the document in the BEDIM DATABASE.

**INASP :** International Network for the Availability of Scientific Publications.  
<http://www.inasp.info/ajol/whatis.html>

### **HUMAN NUTRITION**

*Huis A. van & van-Huis A. - Insects as food in sub-Saharan Africa.*

**Source:** Insect Science and its Application 2003, 23 (3): 163-185

**Language:** English

**Address:** Laboratory of Entomology, Wageningen University, P.O. Box 8031, 6700 EH Wageningen, Netherlands.

**Abstract:** Data on insects as food in sub-Saharan Africa were collected by reviewing the literature and conducting interviews in a number of African countries. A list of about 250 edible insect species from Africa was compiled. Of these, 78 percent are Lepidoptera (30%), Orthoptera (29%) and Coleoptera (19%), and 22 percent Isoptera, Homoptera, Hymenoptera, Heteroptera, Diptera and Odonota. Insects are rich in protein, vitamins and minerals, and a good source of iron and B-vitamins. Examples of insects being toxic are given, but often traditional methods are used to remove the poison. Whether or not insects are eaten depends not only on taste and nutritional value, but also on customs, ethnic preferences or prohibitions. The harvesting of insects is often done by women. The way of collecting depends on insects' behaviour. For example, inactivity at low temperatures enables easy catching of locusts and grasshoppers in the morning. Night flyers (termites, some grasshoppers) can be lured into traps by light, and some insects like palm weevils can be attracted to artificially created breeding sites. Some species (crickets, cicadas) can be located by the sound they make. A number of tools are used to facilitate capturing such as glue, sticks, nets and baskets. Because most insects are only seasonally available, preservation by drying is often practiced. Some examples of how to prepare them as food are given from important insect groups. To manage insects in the interest of food security more attention should be given to environmentally sustainable harvesting methods. They should be made better available throughout the year by developing improved conservation methods or by farming this mini-livestock. Considering the economic, nutritional and

ecological advantages of this traditional food source, its promotion deserves more attention both from national governments and assistance programmes.

BDB ref.: BEDIM 509

**Negróni G. – Frogs as Food**

**Source:** Paoletti, M.G., Editor. Ecological Implications of Minilivestock; role of rodents, frogs, snails, and insects for sustainable development, pp 73 – 92.

**Language:** English

**Address:** Alvea Co-operative Society, Via Guerrazzi 18, 40100 Bologna, Italy.  
E-mail: [sig1564@iperbole.bologna.it](mailto:sig1564@iperbole.bologna.it)

**Abstract:** Frog populations are declining worldwide due to widespread environmental degradation and wild frog population capture. Frog leg imports are estimated to have been around 8,000 t y<sup>-1</sup> in 2001 in the European Union (EU) member states and 30,000 throughout the world. Frog consumption is an ancient tradition in most wetland areas. France has the highest European consumption of frogs. The main frog ethnoculture traditions are described with possible commercial, small-scale, and traditional frog breeding techniques. There is no commercial frog production in Europe; consumption depends mostly on imported frogs. Production is concentrated in South America (farming) and Asia (especially for wild frogs).

BDB ref.: BEDIM 543

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**WILD SUIFORMS**

**Gomes R.A., Bonuti M.R., De Sousa Almeida K. & Do Nascimento Adjair A. - Infection of heminths in wild boar (*Sus scrofa scrofa*) raised in captivity in Sao Paulo State, Brazil [Infecoes por helmintos em Javalis (*Sus scrofa scrofa*) criados em cativeiro na regio Noroeste do Estado de Sao Paulo, Brasil]**

**Source:** Ciencia Rural 2005, 35 (3): 625-628

**Language:** Portuguese

**Address:** Univ. Estadual Paulista, FCAV, Jaboticabal, SP, Brazil, Brazil.

**Abstract:** This study aimed at identifying the helminthfauna of Wild Boars (*Sus scrofa scrofa*). The study was developed between October 2001 and May 2002, with 51 animals of different ages and sex, from two private farms from the county of Mirassol and Fernandopolis, Sao Paulo State, Brazil. Group I (GI) had 18 animals ranging from 150 to 360 days old and GII, 33 ranging from 30 and 120 days old. Eight species of nematodes were identified from groups I and II,

with the following prevalence: *Trichuris suis* (16.7% and 30.3%); *Metastrongylus salmi* (50.0% and 15.2%), *Metastrongylus pudendotectus* (5.6% and 3.0%); *Strongyloides ransomi* (27.8% anti 12.1%); *Ascaris suum* (0.0% and 3.0%), *Ascarops strongylina* (27.8%, and 0.0%); *Physocephalus sexalatus* (5.6% and 0.0%); *Oesophagostomum dentatum* (22.2% and 0.0%). There was a total of 7,958 nematodes identified, 6,573 front large intestine (82.6%), 1,246 in lungs (15.7%), 89 from small intestine (1.1%), and 50 in stomach (0.6%) The higher intensity variation was observed for *T. suis* (1 to 1,764), and *M. salmi* (1 to 248).

BDB ref. : BEDIM 418

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### EDIBLE AND USEFUL RODENTS

***Govoni<sup>1</sup> G, Fielding<sup>2</sup> & Paoletti<sup>3</sup> M.G. – Rodent Farming in the Amazon: Experience with Amerindians in Venezuela***

**Source:** Paoletti, M.G., Editor. Ecological Implications of Minilivestock; role of rodents, frogs, snails, and insects for sustainable development, pp 47-71.

**Language:** English

**Address:** <sup>1,3</sup>Dept. of Biology, Padova University, Via U. Bassi 58/b, 35121 Padova, Italy. E-mail: bw.guido@libero.it and paoletti@civ.bio.unipd.it <sup>2</sup>University of Edinburgh, Centre for Tropical Veterinary Medicine, Easter Bush, Roslin, Midlothian, EH25 9RG. E-mail: Denis.Fielding@ed.ac.uk

**Abstract:** Minilivestock represents a promising sector of animal production as it provides the opportunity to cope with the increasing food demand in the developing world. In the state of Amazonas, Venezuela the Amerindian communities are facing conflicts with new settlers for the use of natural resources, which is leading to overexploitation of the existing biodiversity, a reduction in wildlife populations, and transformation of the rainforest into poor quality cultivable land. Reductions in the wild populations of pacas (*Agouti paca*) and agoutis (*Dasyprocta* spp) induced the enactment of a statute to promote the protection of the paca, the most threatened species. Although subsistence hunting is allowed to indigenous people in the current situation, its original meaning has changed, resulting progressive depletion of the wild populations. In this context, breeding under human control of pacas and agoutis could offer a chance to local people to increase their incomes and could also represent an opportunity to reduce hunting pressure.

This paper discusses the importance and role of pacas and agoutis in the life of some indigenous people of Venezuela, the

realization of a rodent farming project in several Amerindian communities, and the results of a follow-up assessment carried out four years after the initial project's conclusion. Investigation of the local knowledge of the aforesaid rodents obtained by visiting indigenous communities and utilizing participatory techniques, represented

BDB ref.: BEDIM 543

*Herrera E.A. - Size of testes and scent glands in capybaras, Hydrochaeris hydrochaeris (Rodentia: caviomorpha)*

Source: Journal of Mammalogy 1992, 73(4): 871- 875

Language: English

Address: Departamento de Estudios Ambientales, Universidad Simon Bolivar, Apartado 89.000, Caracas 1080- 4, Venezuela

Abstract: The volume of the morrillo (snout scent-gland) of adult capybar males was found to correlate significantly with testes mass ( $r = 0.359$ , d.f. = 110,  $P < 0.0001$ ). This was independent of body size. Males in better condition did not have larger testes or morrillos, whereas age did correlate with size of the morrillo and testes. These results were related to the higher rates of scent marking and reproductive success of dominant males reported in previous studies.

BDB ref.: BEDIM 420

*Poppitt\* S. D., Speakman J. R. & Racey P. A. - Energetics of Reproduction in the lesser Hedgehog Tenrec, Echinops telfairi (Martin)*

Source: Physiological Zoology 1994, 67(4): 976-994

Language: English

Address: \*correspondence to: Dr. S. D. Poppitt. Dunn Clinical Nutrition Centre, Hills Road, Cambridge CB2 2DH, United Kingdom.

Abstract: The aim of this study was to determine how a tropical tenrec is able to meet the obligatory extra costs of pregnancy and lactation. During pregnancy, mean body weight increased from 174.8g (7.3 SD) to 279.0g (10.0 SD), resting metabolic rate (RMR) from 28.7 kJ. d<sup>-1</sup> (0.4 SD) to 68.1 kJ. d<sup>-1</sup> (1.3 SD), and daily energy expenditure (DEE) from 42.1 kJ. d<sup>-1</sup> (3.5 SD) to 87.2 kJ. d<sup>-1</sup> (2.9 SD). Females actively maintained homeothermy throughout pregnancy. Food intake increased from 49.6 kJ. d<sup>-1</sup> (2.5 SD) to 121 kJ. d<sup>-1</sup> (13.1 SD) during mid pregnancy they gradually fell to 70.2kJ. d<sup>-1</sup> (10.6 SD) prior to parturition. Throughout lactation, body weight was stable at 262.6 g (4.3 SD). The mean RMR was 35.3 kJ. d<sup>-1</sup> (0.8 SD), and DEE was 61.4kJ. d<sup>-1</sup> (14.2 SD) when one pup was suckled. Homeothermy was also maintained throughout lactation. Food intake increased dramatically to 151 kJ. d<sup>-1</sup> (20.3 SD), and the energy transferred as milk to the litter was calculated to be

between 34.9 kJ d<sup>-1</sup> and 116.3 kJ. d<sup>-1</sup>. We conclude that the extra energetic costs of reproduction were met by an increase in energy intake. Animals remained homeothermic, and there was no evidence of metabolic compensation.

BDB ref.: BEDIM 418

*Mensah G.A., Brönnemann A., Stier C.H. & Gall C.F. – Practical aspects of grass-cutter (Thryonomys swinderianus). V. Normal growth and wear of incisors. [Aspects pratiques en élevage d'aulacodes (Thryonomys swinderianus). V. Croissance et usure normales des incisives.]*

Source: Revue Elev. Méd. Vét. Pays Trop. 1992, 45(2): 175-178

Language: French

Address: Institut de production animale des pays tropicaux et subtropicaux, Université de Hohenheim (480), Garbenstraße 17, D-7000 Stuttgart 70, Allemagne.

Abstract: With reared grasscutters, a bad and insufficient incisors wear could be observed. To understand the origin of this phenomenon, growth and wear of the incisors were studied on grasscutters aged 4 to 12 months. The incisors grow up by 0.039 - 0.055 mm/day et their wear is of 0.033 - 0.040 mm/day. There is an overgrowth of 0.006 – 0.015 mm/day that resulted however in no tooth problem at all.

BDB ref. : BEDIM 334

*Diouf<sup>1</sup> M. & Durette-Desset<sup>2</sup> M.C. – Two new species of Nippostrongylinae (Nematoda, Trichostrongylina) parasites of Cricetomys gambianus and Arvicanthis niloticus (Muridae) from Senegal\**

Source: Parassitologia 2002, 44: 97-101

Language: English

Address: <sup>1</sup>Laboratoire Eau et Santé, Cirad, BP 1386, Dakar, Sénégal; Laboratoire de Parasitologie, Département de Biologie animale, Faculté des Sciences et Techniques de l'Université Ch. A. Diop, Dakar, Sénégal; <sup>2</sup>Laboratoire de Biologie parasitaire, Protistologie, Helminthologie et CNRS FR63, Muséum National d'Histoire Naturelle, 61 rue Buffon, 75231 Paris Cedex 05, France.

Abstract: Two new Nippostrongylinae (Heligmosomoidea, Heligmonellidae) originating from Senegal are described. *Heligmonina bioccai* n. sp., a parasite of *Cricetomys gambianus* (Cricetomyinae) found in the surroundings of Dakar and *Neoheligmonella bai* n. sp., a parasite of *Arvicanthis niloticus* (Murinae) from the Province of Richard Toll. *H. bioccai* n. sp. is related to *H. hybomysi* (Durette-Desset, 1966) a parasite of *Hybomys univittatus* from the Central African Republic by some characteristics of the caudal bursa and of the synloph. They are the only two species with the same pattern of caudal bursa: type 1-3-1 for the right lobe, 2-3 for the left

lobe, and with the same number and disposition of the cuticular ridges at mid-body in the female. The two species are differentiated by the size (three times smaller in *H. hybomysi*), the ratio of spicule length on body length (7.6% versus 17% in *H. hybomysi*) and by a different synopse in male and posterior part of female. *N. bai* n. sp. is differentiated from the closely related species *N. dielmensjs* Diouf, Bâ and Durette-Desset, 1997, also a parasite of *Arvicanthis niloticus* from Senegal by rays 8 arising asymmetrically on the dorsal ray and by the deirids situated at the same level as the excretory pore.

BDB ref.: BEDIM 157

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## GUINEA PIGS

*Nuwanyakpa M., Lukefahr\* S.D., Gudahl\*\* D. & Ngoupayou\*\*\* J.D. – The current stage and future prospects of guinea pig production under smallholder conditions in West Africa; 1. Global overview*

Source: Livestock Research for Rural Development 1997, 9 (5):

Language: English

Address: PLAN International, PO Box 25326, Messa, Yaoundé, Republic of Cameroon, West Africa \*Department of Animal & Wildlife Sciences, Texas A&M University, Kingsville, Campus Box 156, Kingsville, TX 78363, USA \*\*HPI/Africa Programs, PO Box 808, Little Rock, AR, 72203, USA \*\*\*Institute of Animal and Veterinary Research, PO Box 1457, Yaoundé, Republic of Cameroon.

Abstract: The Guinea pig (*Cavia porcellus*), a member of the rodent order, is considered a very promising “micro-livestock” species for rural development because it requires little capital, equipment, space and labor, and provides an inexpensive, readily available and high quality meat. From prehistoric times, it has been raised for food in the central highlands of the Andes region of Latin America. Guinea pigs (GP) are now also reared for meat in different countries of Latin America, Asia and Africa.

Although GP contribute to the alleviation of protein deficiency in the diets of people in developing countries, they have largely been neglected as a livestock species. Most research reports have focused on the role of GP as laboratory specimens. Thus, their actual contributions to food production have been greatly ignored and/or underestimated by scientists, extension and other development workers, and policy makers in the agricultural sector in developing countries. Especially in Africa, there is little published information on their production, marketing and consumption under smallholder conditions in developing countries. In West Africa, much of the work on smallholder GP production has been done in

Cameroon. This paper provides a global overview of GP production with a special locus on the traditional subsistence rearing system as practiced by limited-resource farmers.

BDB ref.: BEDIM 198

*Verma S., Katoch R.C., Mahajan A. & Chahota R. – Ring worm infection in Guinea pigs*

Source: Indian Veterinary Journal 2000, 77: 723-724

Language: English

Address: Department of Veterinary Microbiology, HPKV, Palampur, Himachal Pradesh - 176 062, India.

Abstract: The guinea pig (*Cavia porcellus*) has long been identified as a laboratory animal. The animal experiments may be influenced profoundly by a number of environmental and biological factors. The mycobiotic agents are often interfering factors in animal research and may disrupt studies by causing clinical disease, lesions and eventually death. This communication records an outbreak of dermatophytoses in guinea pigs.

BDB ref.: BEDIM 52

*CHEN Xin-ru, YAN Shun-sheng, XU Yi-mei – Preliminary investigation of the influence of vitamin C on the growth development of guinea pig*

Source: Endemic Diseases Bulletin 2001, 16 (1): 90- 91

Language: Chinese

Address: Xinjiung Intitute for Endemic Disease Control and Research, Urumqi, Xinjiang 830002, China

Abstract: In order to explain the influence of vitamin C on the growth development of guinea pig, the active ascorbic acid of different doses was supplied to pellet fodder of the guinea pig. Effects were observed on the growth development of the guinea pig. This groups of guinea pig showed some signs of deficiency within 15~20 days when vitamin C was withheld. This guinea pig had often rough hair coat, diarrhea, weight loss and ocular and nasal discharge. The death from starvation or secondary infection followed in 30~40 days. There was no difference on the growth development of guinea pig between the control group and other groups that the vitamin C was supplied in guinea pig feed, only some guinea pigs had molt phenomenon.

BDB ref.: BEDIM 50

*Darmon N., Abdoul E., Roucayrol\* A.-M., Blaton M.-A., Briend A., Desjeux J.-F., & Heyman M. – Sensitization to cow's milk proteins during refeeding of Guinea pigs recovering from polydeficient malnutrition*

**Source:** Pediatric Research 1998, 44 (6): 931-938  
**Language:** English  
**Address:** Unité 290 de l'Institut National de la Santé et de la Recherche Médicale, Hôpital Saint-Lazare, 107 rue du Faubourg Saint-Denis, 75010 Paris, France. Service d'anatomo-pathologie, Centre Hospitalier Inter-communal de Villeneuve St-Georges, 40 allée de la Source, 94195 Villeneuve St-Georges, Cedex, France.

**Abstract:** It has previously been shown that milk sensitization aggravates intestinal dysfunction in the malnourished guinea pigs, suggesting that it may also impair the recovery from malnutrition. To test this hypothesis, the growing guinea pigs were malnourished by feeding only maize for 7 d and then were refeed for 21 d with a balanced diet containing either intact or hydrolyzed cow's milk proteins. The control animals received the hydrolyzed milk protein diet for 28 d. After an initial period of total inhibition of growth owing to maize, guinea pigs gained weight regularly, with both balanced diets, and there was no evidence of mucosal damage at the end of the refeeding period. However, refeeding with intact milk proteins induced milk sensitization, which was demonstrated on the systemic level by the presence of anti- $\beta$ -lactoglobulin IgG1 antibodies, and on the local level by the intestinal anaphylaxis measured by the increase in short circuit current induced by  $\beta$ -lactoglobulin ( $16.4 \pm 2.6 \mu\text{A}/\text{cm}^2$ ) in jejunal segments mounted in Ussing chambers. Such an immune sensitization was associated with impaired intestinal permeability, as both the ionic conductance ( $21.0 \pm 1.6$  versus  $14.6 \pm 0.7 \text{ mS}/\text{cm}^2$ ) and the transepithelial fluxes of horseradish peroxidase ( $537 \pm 203$  versus  $152 \pm 28 \text{ ng}/\text{h}\cdot\text{cm}^2$ ) were significantly increased in guinea pigs refeed with the intact milk proteins compared with controls. In contrast, there was no difference in intestinal permeability between controls and guinea pigs refeed with the hydrolyzed milk protein diet. These data show that sensitization to cow's milk proteins can develop in guinea pigs recovering from severe malnutrition and may impair full intestinal repair.

**BDB ref.:** BEDIM 45

*Boucher\* S., Plassiart\*\* G. & Adamus\*\*\* C. – Cas de carence en vitamine E dans trois élevages de cobayes [Cases of vitamin E deficiency in three guinea pig farms]*

**Source :** Le Point Vétérinaire 1998, 29 (190) : 273-278  
**Language :** French  
**Address :** \*Labovet BP 539 85505 les Herbiers Cedex, \*\* Laboratoire 11, rue Leclerc de Hautecloque, 57006 Metz Cedex, \*\*\*Unité d'anatomie pathologique de l'ENVN, BP 40706, 44307 Nantes Cedex

**Abstract :** Severe cases of myopathy, high mortality mainly on females and abortions are the main sign of vitamin E deficiency. The analysis of the feed reveals a supplement of 31 mg/kg of vitamin E.

Histology carried out on smooth to muscles highlights the presence of multifocal hyaline necrosis. The treatment consists in injections of 0,2 mg/kg of sodium selenite and of 382 mg/kg of  $\alpha$ -tocopherol acetate and 200 mg/kg of vitamin C. The most affected animals get a perfusion of isotonic mixed solution (NaCl, glucose). The farm is considered saved after two weeks.

BDB ref.: BEDIM 43

*Peaker M. & Taylor E. – Sex ratio and litter size in the guinea-pig*

Source: Journal of Reproduction and Fertility 1996, 108: 63-67

Language: English

Address: Hannah Research Institute, Ayr KA6 5HL, UK

Abstract: A significant relationship between sex ratio and litter size at birth was observed in the young of guinea-pigs caged singly from 8 weeks of age and during their first pregnancy; a male was present only at or around oestrus. Small litters (1-2 young) had significantly more males than did large litters (4-5 young). Such a relationship was not apparent in animals housed communally, whether young or older or in their second pregnancy. Litters in late pregnancy (day 63) or at delivery were significantly smaller than at mid-pregnancy (day 35). A significant negative relationship was found between litter size and body mass at birth and to at least 63 days of age. Growth rates during the period of lactation were lower in animals born in large litters. The possible adaptive significance of a plastic relationship between litter size and sex ratio is considered together with the physiological mechanism that might be involved.

BDB ref.: BEDIM 38

*Kouonmenioc\* J., Ngou Ngoupayou\* J.D., & Fotso Tagny\* J.M. – Consumption of some tropical grass forages by Guinea-Pigs (Cavia porcellus): Performances and determination of required areas to maintain a flock. [Consommation de quelques graminées tropicales par le cobaye (Cavia porcellus): performances et détermination des surfaces nécessaires à l'entretien d'un cheptel.]*

Source : Tropicultura 2000, 18 (2) : 80-83

Language : French

Address : Institut de Recherches Zootechniques et Vétérinaires de Nkolbisson, BP 1457 Yaoundé, République du Cameroun.

Abstract : In order to develop the mini-livestock sector in the agricultural production systems, investigations have been carried out on five tropical grass forages in the Cameroon forest humid zone in order to show the impact of organic manure on the total biomass production for guinea-pigs feeding. Adequate forages area

required to maintain a family size guinea-pigs flock was determined. These various forage species compared in terms of growth showed positive response to guinea pigs manure. *Panicum maximum* with a 8 week regrowth which yielded 5147 kg DM/ha (on increase of 1501 kg) seemed to be the best forage in terms of production. Positive response of these grasses to organic manure from guinea-pigs farming may direct the farmer not to use the manure not only for food and cash cropping, but also to sustain forage production. For a 8 weeks cutting frequency, the adequate forage area to maintain a family flock size of 20 animals ranges from 90.8 m<sup>2</sup> x 2 for *Brachiaria ruziziensis* to 152.9 m<sup>2</sup> x 2 for *Trypsacum laxum*.

BDB ref. : BEDIM 48

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## FROGS

**Pearson<sup>\*1</sup> M.D., Hirono I., Aoki<sup>2</sup> T., Miranda<sup>3</sup> R. & Inglis<sup>1</sup> V. - Virulence properties of motile aeromonads isolated from farmed frogs *Rana tigerina* and *R. rugulosa***

**Source:** Diseases of Aquatic Organisms 2000, 40: 185-193

**Language:** English

**Address:** <sup>1</sup>Institute of Aquaculture, University of Stirling, Stirling FK9 4LA. Scotland, UK. <sup>2</sup>Laboratory of Genetics and Biochemistry. Department of Aquatic Biosciences, Tokyo University of Fisheries. Konan 4-5-7, Minato-ku, Tokyo 108. Japan. <sup>3</sup>Bureau of Fisheries and Aquatic Resources, 860 Quezon Ave., Quezon City. Meiro Manila 3008, The Philippines.

**Abstract:** Virulence factors were compared in *Aeromonas* species isolated from clinically normal and septicaemic farmed frogs from Thailand. Haemolysin activities against frog erythrocytes were significantly different within the collection of aeromonads. Groups of high haemolytic activity (unspeciated *Aeromonas*, Au), moderate haemolytic activity (*A. hydrophila*), and low haemolytic activity (*A. veronii biovar sobria*, *A. veronii biovar veronii*, *A. caviae*, *A. schubertii*) were noted. DNA colony hybridisation studies revealed that Au isolates possessed a haemolysin gene (ASHI) which was not present in any of the other Thai aeromonads or type strains tested. Elastinolytic activity was demonstrated in 90% of the Au isolates, 60% of the *A. hydrophila* isolates and in none of the other motile aeromonads. The cytotoxic activity of the *Aeromonas* isolates varied according to the source of cells used in the assays. Cells from rainbow trout were extremely sensitive to Au toxins but less so to toxins produced by other species. In contrast mammalian cells showed very little sensitivity to Au

toxins but were more sensitive to toxins produced by *A. hydrophila*. Selection of suitable assay substrates is therefore important.

BDB ref.: BEDIM 398

*Oyamada T., Hirata T., Hara M., Kudo N., Yamada<sup>1</sup> T., Yoshikawa<sup>1</sup> H., Yoshikawa<sup>1</sup> T. & Suzuki N. - Spontaneous larval *Gnathostoma nipponicum* infection in frogs*

Source: Journal of Veterinary Medical Science 1998, 60(9): 1029- 1031

Language: English

Address: Departments of Veterinary Parasitology and "Veterinary Pathology, School of Veterinary Medicine and Animal Sciences, Kitusuto University, Towudu, Aomori 034-8628, Japon

Abstract: From June 1993 to September 1997, a survey was carried out for the prevalence of larval *Gnathostoma nipponicum* infection in several kinds of frogs, toads, and their tadpoles collected from an endemic area of this nematode in Aomori Prefecture. Two frog species, one of 436 (0.2%) *Rana nigromaculata* and 51 of 147 (34.7%) *Rana catesbeiana* were infected, and a total of 446 advanced third-stage larvae (AdL3) of *G. nipponicum* were recovered. These results confirmed that two frog species which can serve as the second intermediate and/or paratenic hosts in the life cycle of *G. nipponicum* exist in nature. This report is the first record of spontaneous infection of frogs with AdL3 of *G. nipponicum*.

BDB ref.: BEDIM 389

*Flores-Nava A. & Vera-Munoz P. - Growth, metamorphosis and feeding behaviour of *Rana catesbeiana* Shaw 1802 tadpoles at different rearing densities*

Source: Aquaculture Research 1999, 30: 341-347

Language: English

Address: Correspondence: A Flores-Nava. Centro de Investigacion y de Estudios Avanzados del IPN-Mérida. AP 73-Cordemex. Mérida Yucatan, 97310 Mexico

Abstract: An experiment was carried out to investigate the effects of rearing density on growth, metamorphosis and behavioural patterns of feeding in bullfrog, *Rana catesbeiana* Shaw, tadpoles. Stage 25 (Gosner) tadpoles from a single cohort were stocked at 0.5, 1.0, 2.0, 4.0 and 8.0 L<sup>-1</sup> in 6-L plastic containers. A combination of phytoplankton and supplementary feed was used. There was an inverse relationship between rearing density and growth and metamorphosis above two organisms L<sup>-1</sup>. Tadpoles reared at 0.5 and 1.0 L<sup>-1</sup> reached the metamorphic climax in 135 and 120 days,

respectively, whereas more than 80% of all tadpoles reared at 4 and 8 L<sup>-1</sup> did not metamorphose at all. Intraspecific competition appeared to be consistent among the cultured organisms regardless of the rearing density. Smaller tadpoles were displaced to sites distant from feeding points during supplementary feed addition, while no displacement was observed during phytoplankton addition. It is concluded that bullfrog tadpoles grow well at up to two organisms and that intraspecific competition is present within cultured tadpoles regardless of stocking density and may result from intrinsic genetic variability.

BDB ref.: BEDIM 391

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## SNAILS

*Elmslie L.J. – Snail Collection and Small-scale Production in Africa and Europe*

**Source:** Paoletti, M.G., Editor. Ecological Implications of Minilivestock; role of rodents, frogs, snails, and insects for sustainable development, pp 93 – 121.

**Language:** English

**Address:** Via Orti Gianicolensi 5, 00152 Roma, Italy. E-mail: lelmslie@pelagus.it

**Abstract:** Snails have been collected from wild populations, traded, and eaten since time immemorial, providing a significant source of food and income for poorer sections of the human population, and continue to do so today. Traditional collection of edible snails from wild populations does not threaten their existence. The value of wild snails to the collectors and to the country can be increased by appropriate regulations and reduced by inappropriate ones.

Snail farming is not a way of producing cheap food for the masses but can produce a premium product when appropriate systems are used. Edible snail consumption could be significantly increased if quality supplies were regularly available; however, the market for farmed snails is limited by consumer prejudice, as well as by price. Farmed snails probably account for less than 5% of world consumption at present.

Misguided attempts at snail farming have caused enormous economic damage not only by wasting resources but also by spreading agricultural pests.

BDB ref.: BEDIM 543

*Otchoumou\* A., Dupont-Nivet M. & Dosso H. - The edible ivorian snails: effects of some vegetables, concentrated diets and dietary calcium on the growth of Archachatina ventricosa (Gould, 1850) in indoor rearing. [Les escargots*

**comestibles de Côte d'Ivoire: effets de quelques plantes, d'aliments concentrés et de la teneur en calcium alimentaire sur la croissance d'*Archachatina ventricosa* (Gould, 1850) en élevage hors-sol en bâtiment.]**

**Source :** Tropicultura 2004, 22 (3) : 127-133

**Language :** French

**Address :** \*Laboratoire de Biologie et de Cytologie Animales, UFR des Sciences de la Nature, Université d'Abobo-Adjamé, 26 BP 623, Abidjan 26, Cote d'Ivoire. Email: atcho@aviso.ci.

**Abstract :** *Archachatina ventricosa* snails with 37.06 g body weight and 6.01 cm shell length were given two vegetable diets dialed with leaves of *Lactuca sativa* (Apiaceae) and *Brassica oleracea* (Brassicaceae) for R<sub>1</sub>, leaves of *Laportea aestuans* (Urticaceae) and *Phaulopsis falcisepala* (Acanthaceae) for H<sub>2</sub> and four concentrated diets (RT, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub>) with variable calcium content (0.05%, 0.59%, 6.82%, 12.02%, 14.03% et 16.01% respectively) in order to determine the calcium content inducing the best growth and the cumulated mortality rate. This optimum calcium content was 16.01%. At higher calcium content, *Archachatina ventricosa* produced more shell than meat.

**BDB ref. :** BEDIM 542

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## WORMS

**Dalby<sup>a,b,\*</sup> P.R. , Baker<sup>a,c</sup> G.H. & Smith<sup>a,b</sup> S.E. - Competition and cocoon consumption by the earthworm *Aporrectodea longa***

**Source:** Applied Soil Ecology 1998, 10: 127-136

**Language:** English

**Address:** <sup>a</sup>CRC Soil and Land Management, PMB1, Glen Osmond, 5064 SA, Australia <sup>b</sup>Department of Soil Science, Waite Campus, University of Adelaide, PMB1, Glen Osmond, 5064 SA, Australia. <sup>c</sup>CSIRO Division of Entomology, PMB2, Glen Osmond, 5064 SA, Australia  
\*Corresponding author. Present address: Department of Soil Science. Waite Campus, University of Adelaide, PMB1, Glen Osmond, 5064 SA Australia. Tel.: +61 8 8303 6518; Fax: +61 8 8303 6511; E-mail: [pdalby@waite.adelaide.edu.au](mailto:pdalby@waite.adelaide.edu.au).

**Abstract:** Interactions were investigated between the deep burrowing earthworm *Aporrectodea longa* and three other common pasture species (*A. caliginosa*, *A. trapezoides* and *Microscolex dubius*) and the roles these other species would have on reducing the ability of *A. longa* to colonise agricultural land in the high rainfall zone (>600 mm) of southern Australia. Experiments were conducted in pots in the laboratory or glasshouse and in cages in the field. In most experiments, field soil was used and in some experiments, an artificial soil of commercially available garden

loam mixed with bentonite clay was used. To determine whether competition occurred, the growth, survival and reproduction of earthworms was compared between single-species and mixed-species treatments.

Competition between *A. longa* and *A. caliginosa* was weak and no competitive effects were measured between *A. longa* and *A. trapezoides*. The presence of *A. longa* significantly reduced the reproductive output of *M. dubius*, possibly by removing its food source and habitat or consuming its cocoons. This is the first reported evidence that individuals of one earthworm species may consume the cocoons of another.

BDB ref.: BEDIM 522

Boedts B. - *Essais préliminaires d'élevage du ver à soie au Rwanda*

Source: Sericologia 1992, 32(1): 105-107

Language: French

Address: 2117, Avenue de la Forêt, 1050 Bruxelles, Belgique.

Abstract: Three rearing trials were conducted on silkworm during different seasons in an agri-veterinary school located in a mid-altitude region in Rwanda. One bivoltine race of *Bombyx mori* imported indeed from Madagascar was nourished with leaves of the local rwandese variety of *Morula alba*. Earlier resultats gathered show that it is possible to practice this rearing in Rwanda and that various forms of moriculture could be considered.

BDB ref.: BEDIM 450

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## INSECTS

### *Defoliart G. – Overview of role of Edible Insects in Preserving Biodiversity*

Source: Paoletti, M.G., Editor. Ecological Implications of Minilivestock; role of rodents, frogs, snails, and insects for sustainable development, pp 123-140.

Language: English

Address: Dept. of Entomology, University of Wisconsin, Madison, WI 53706, USA

Abstract: The principle adopted here is that factors pending to increase food and/or income for economically marginal rural families, while decreasing pressure for land clearing, pesticides, and intensive agriculture, will tend to favor preservation of biodiversity and sustainable future. The great diversity of habitats of insect species that serve as traditional foods presents an almost endless diversity of situations in which recognition and enlightened management of the food insect resource can result not only in

better human nutrition, but simultaneously aid in maintaining diversity of habitats for other forms of life. Approaches include: 1) enhancing forest conservation and management by acting on the desire of local populations for protection of traditional insect foods (i.e., caterpillars in Zambia and Zaire); 2) reducing poaching in parks and wildlife preserves by allowing sustainable use of the food insect resources by the local people (i.e., caterpillars in Malawi); 3) reducing pesticide use by developing more efficient methods of harvesting pest species that are traditional foods (i.e., grasshoppers); 4) increasing environmental and economic efficiency by developing dual product systems (i.e., silks and silk moth larvae/pupae, honey and honeybee brood); 5) reducing organic pollution by recycling agricultural and forestry wastes into high-quality food or animal feedstuffs (i.e., fly larvae, palm weevils). Other relevant considerations are that some edible insect species enhance their local environment in various ways (i.e., leafcutter ants in S. America) or create additional diversity of species within the habitat (i.e., termites in Africa). Some, as shown in studies with crickets exhibit considerably higher food conversion efficiency than beef cattle when fed diets of similar quality. Finally, there is need for research on industrial scale mass production of edible insects, for increased recognition of the nutritional and environmental importance of insects by national governments, and for increased involvement of Western media and academia in dispelling unfounded cultural biases in the Western World toward insects as food.

BDB ref.: BEDIM 543

*Van Huis A. – Insects Eaten in Africa (Coleoptera, Hymenoptera Diptera, Heteroptera, Homoptera)*

**Source:** Paoletti, M.G., Editor. Ecological Implications of Minilivestock; role of rodents, frogs, snails, and insects for sustainable development, pp 231-244.

**Language:** English

**Address:** Laboratory of Entomology Wageningen University, P.O. Box 8031, 6700 EH Wageningen, The Netherlands. E-mail: Arnold.vanHuis@wur.nl

**Abstract:** In sub-Saharan Africa 246 insect species are eaten, of which 30% belong to Lepidoptera, 29% to Orthoptera and 6% to Isoptera. The other 35% include Coleoptera (19%), Homoptera (7%), Hymenoptera (5%), Heteroptera (3%), Diptera and Odonota (1%). The most important beetle species eaten is the larvae of the palm weevil (*Rynchophorus phoenicis*), which is considered a delicacy throughout humid Africa. Harvesting of the beetle larvae can be timed by cutting palms or tees several weeks earlier. From Hymenoptera, queens of the ant *Carebara vidua* are consumed. Other ant species are often used to flavor dishes. Bee larvae are

often eaten together with the harvested honey. Pregnant women in Africa consume clay not only from termite mounds but also from nests of the mud-dauber wasp, *Synagris* sp. This geophagy provides them with the minerals and trace elements necessary for fetal growth. From Diptera, the swarming lake fly *Chaoborus edulis* is made into a cake, which is very rich in protein and iron. From Heteroptera the pungent *Natalicola delegorguei* is eaten in southern Africa and *Agonoscelis versicolor* in Sudan from which an edible oil is derived. Of the Homoptera, a number of cicada species are eaten. Excretions from the psyllid *Arytaina mopane* are known as mopane bread or lerp, which is collected as food in southern Africa. The waxy substance of another homopteran, the flatid *Phromnia rubra* is eaten in Madagascar. Possibilities are mentioned to stimulate the consumption of edible insects in Africa.

BDB ref.: BEDIM 543

*Tommaseo-Ponzetta M. – Insects: Food for Human Evolution*

**Source:** Paoletti, M.G., Editor. Ecological Implications of Minilivestock; role of rodents, frogs, snails, and insects for sustainable development, pp 141-161.

**Language:** English

**Address:** Zoology Dept., University of Bari, Via Orabona 4, 70125 Bari, Italy.  
**E-mail:** m. tommaseo@biologia.uniba.it

**Abstract:** Scientific attention is currently focusing even more on the role of insects in the diet of traditional societies. Since insects are considered as a food rich in nutritional value. It is therefore reasonable to infer that insects played an essential role in the diet of our ancestors, of crucial importance in satisfying specific physiological requirements in the early stages of human evolution. Brain expansion in early *Homo* sp. required high-quality food and insects were a reliable alimentary source accessible to women and children as well as men.

The study of nonhuman primates in their natural environment and a cautious homology with the subsistence strategies of today's foragers, offer important behavioral models that integrate the data of entomological archaeology, a science still in its infancy. The importance of insects in prehistoric diets has been largely ignored by archaeological research, since their presence in the past has left such elusive traces as to be missed unless specifically sought. The available direct and indirect evidence is reviewed here.

Lastly hypotheses are advanced for future research: DNA analysis and the application of the AMmtDB, the DNA databank of invertebrates, may be precious instruments for the identification and phylogenetic study of insect remains found in archaeological sites.

BDB ref.: BEDIM 543

***Pemberton R. W. - Contemporary use of insects and other arthropods in traditional Korean medicine (Hanbang) in South Korea and elsewhere***

**Source:** Paoletti, M.G., Editor. Ecological Implications of Minilivestock; role of rodents, frogs, snails, and insects for sustainable development, pp 459 - 473.

**Language:** English

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**Abstract:** Insects and other arthropods have appeared in pharmacopeias of traditional Korean medicine but little is known about their use in modern South Korea. Interviews were conducted with 20 traditional medicine doctors at clinics in South Korea's *Kyeong Dong Shijang* in Seoul (one of the world's largest traditional drug markets) in 1993 to learn about the current patterns of usage. Seventeen products were prescribed and the use of arthropodal medicines either stable or increasing. Centipedes (*Scolopendra* spp.), used primarily to treat arthritis, and the silk moth fungus (*Beauveria bassiana* which infects silk moth larvae) used mostly to treat stroke, were the two most frequently prescribed and medically important arthropod drugs. Most of the arthropod drugs were traditionally collected or reared on the Korean Peninsula but are now imported, mainly from China. Folk logic appears to be the basis for some arthropod drugs use (i.e., centipedes, which have many legs, were used for leg problems). But many of the arthropods used have venoms and other defensive chemicals that are biologically and probably pharmaceutically active. The Korean use of arthropods as drugs (as well as for food and enjoyment) is due, in part, to more positive attitude towards these animals compared to many cultures. Use of traditional Korean medicine has expanded dramatically in the last 30 years and spread with Korean immigrants to the United States and other countries where Koreans have settled, such as Australia. Arthropod-based medicine is consumed by Koreans living overseas, a use facilitated by internet marketing, primarily by Chinese mainland companies. Terrestrial arthropods appear to be an unexplored and unexploited source of drugs for modern medicine.

**BDB ref.:** BEDIM 543

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**MINILIVESTOCK**

***Paoletti M.G. & Angelo L.D. – Minilivestock, Environment, Sustainability, and Local Knowledge Disappearance***

**Source:** Paoletti, M.G., Editor. Ecological Implications of Minilivestock; role of rodents, frogs, snails, and insects for sustainable development, pp 73 – 92.

**Language:** English

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**Abstract:** A multitude of small animal creatures have been adopted as food by local human cultures, especially in the tropics. If many species are potentially edible not all are eaten and sometimes individual species are avoided and considered poisoning (the two different stages of the same caterpillar in the cover page of the book. In areas with major biodiversity different ethnic groups utilize different species. If loss of species and biodiversity can be the effect of improper management, when target invertebrates or smaller animals are considered as food or regarded as semidomesticates, in most cases they are protected from major decline. At the same time, hunting and collecting pressure on wild species can be decreased if semidomestication takes place successfully. The higher profile of nutrients, vitamins, proteins and fats and especially the poliunsaturated fatty acids confer to such a myriad of small creatures far more interest than what has been paid yet. The local knowledge is a crucial milestone of these sensibilities and traditional unwritten cultures. To maintain and promote locally and extend to the local markets this sensibility and interest towards minilivestocks must become a priority Major urban populations as well have to better acknowledge the importance of local knowledge and biodiversity resources. Educational programs have also to he carefully developed.

**BDB ref.:** BEDIM 543

*Hardouin J. – The Minilivestock: Environment, Education, Research, and Economics*

**Source:** Paoletti, M.G., Editor. Ecological Implications of Minilivestock; role of rodents, frogs, snails, and insects for sustainable development, pp 19-24.

**Language:** English

**Address:** Bureau for Exchange and Distribution of Information on Minilivestock (BEDIM), Faculté Universitaire des Sciences Agronomiques, Passage des Déportés, 2 ; B-5030 Gembloux, Belgium. E-mail: bedim@fsagx.ac.be

**Abstract:** The field of minilivestock is permanently fluctuating, with some species (grasscutters, giant snails) nearly going out as their breeding is totally under control, and others coming in (snakes, bush fowl...). The development of minilivestock breeding is not only a tool within the tropical rural development process, but also a substitute to poaching, accepting the fact that the demand for a

specific meat exists and is sufficiently high. Biological know-how is available and production systems can be established. Training, extension, education and research are required, as well as identification of and remedies for diseases and other ailments. A call to Faculties is formulated to suggest specific themes for student works, theses, etc.

At least one case is known of someone from West Africa having won a Golden Medal after patenting a technique to produce maggots as a meal replacement for raw protein in poultry feed.

BDB ref.: BEDIM 543

***Lanfranchi G.B. – Minilivestock Consumption in the Ancient Near East: the Case of Locusts***

**Source:** Paoletti, M.G., Editor. Ecological Implications of Minilivestock; role of rodents, frogs, snails, and insects for sustainable development, pp 163-174.

**Language:** English

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**Abstract:** Reconstruction of minilivestock consumption in the Ancient Near East is extremely difficult due to the scarcity of precise archaeological data. However, it is attested in a select group of texts stemming from ancient Israel and pre-Classical Syria and Mesopotamia. The dietary prescriptions prevailing in the biblical Hebrew culture generally forbade consumption of any kind of minilivestock, especially of insects and other small animals; contrarily locust consumption was expressly allowed. The capture of locusts for consumption is attested to, as well as their killing to preclude severe crop damage, in some letters to Syrian and Assyrian kings (II<sup>nd</sup> and I<sup>st</sup> millennium BC respectively). The high rank of the writers and addressees clearly underscores that locust consumption was an elitist custom. Some hints for preparation of unique locust recipes are found in scattered texts of various kinds, with a special Soup made from locusts and pomegranates being perhaps the most renowned dish. In an 8<sup>th</sup> century BC Neo-Assyrian relief on a palace slab there is a vivid representation of the introduction of sets of locusts fixed on spits to a royal banquet. Their careful representation as completely preserved animals suggests their preparation at the table, by sauteing or some other procedures. Still, one cannot exclude that their ostentatious presentation was a prelude to the making of the elitist locust-and-pomegranate soup.

BDB ref.: BEDIM 543

**Paterson<sup>1\*</sup> R.T., Joaquin<sup>2</sup> N., Chamón<sup>2</sup> K. & Palomino<sup>2</sup> E. – The productivity of small animal species in small-scale mixed farming systems in subtropical Bolivia**

**Source:** Tropical Animal Health and Production 2001, 33 (1): 1-14

**Language:** English

**Address:** <sup>1\*</sup>Correspondence: Natural Resources Institute, University of Greenwich, Central Avenue, Chatham Maritime, Kent, ME4 4TB, UK. <sup>2</sup>Centro de Investigación Agrícola Tropical (CIAT), Santa Cruz, Bolivia

**Abstract:** The productivity of the scavenging, small animal species (chickens, ducks, pigs, hair sheep and guinea-pigs) commonly found on small-scale farms at the forest margin in subtropical Bolivia was monitored over a full year. Chickens and guinea-pigs were kept mainly for home consumption, while ducks and pigs were kept mainly for sale. Sheep served both purposes, depending upon the family requirements. In the absence of veterinary treatment, the productivity varied greatly between farms. Pigs gave the greatest gross return, but received the largest amount supplementary feed. Under the existing system, chickens, ducks and sheep all gave similar gross returns per breeding female, although chickens produced good returns and made a large contribution to the family diet where the reproductive efficiency was high and the chick mortality was low. Mortality resulting from disease was a major problem in poultry, while internal parasites appeared to be important limiting factors in pigs and sheep. Guinea-pigs showed no major problems apart from theft, and were an important dietary component for immigrant families from the highlands of the country. Small animal species have largely been ignored by agricultural research and development activities in Bolivia and elsewhere. They currently make significant contributions to the livelihoods of poor people in terms of both income and food security, and this could be greatly increased by simple improvements in animal husbandry.

**BDB ref.:** BEDIM 49

**Collavo<sup>1</sup> A., Glew<sup>2</sup> R.H., Huang<sup>3</sup> Y., Lu-TE Chuang<sup>3</sup>, Bosse<sup>4</sup> R. & Paoletti<sup>1</sup> M.G. - House cricket small-scale farming**

**Source:** Paoletti, M.G., Editor. Ecological Implications of Minilivestock; role of rodents, frogs, snails, and insects for sustainable development, pp 518 - 544.

**Language:** English

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**Abstract :** The potential nutritional value of insects in general and the common house cricket, *Acheta domesticus*, in particular in human diets has long been recognized. In addition to providing a rich source of high quality proteins for human consumption crickets and other related insects such as grasshoppers and locusts offer several other advantages as human food sources: they have a short life span, produce numerous offspring, are amenable to human cultivation, and can flourish under a wide range of environmental conditions. The main aims of this study were two: compare the yield of crickets raised on four different diets, and determine the amino acid, fatty acid, and mineral and trace element content of crickets grown under the best of these diets. The four diets were: aromatic-arboreal (AAD), dairy cow diet (DCD), DCD supplemented with yeast, and human refuse diet (HRD). The greatest yield (0.45 g per 10 g of feed) and highest survival (47.5%) of *A. domesticus* was achieved with HRD when grown for 9 weeks in 24 hours daylight. The protein content of crickets raised on all four diets ranged from 56.2 to 60.0% dry weight, and in all cases the essential amino acid score of the proteins approximated or exceeded the World Health Organization protein standard. The crickets contained 63 -122 mg fatty acid per g dry weight, most of which was accounted for by palmitic acid, oleic acid, and the two fatty acids essential for humans, namely linoleic acid and  $\alpha$ -linolenic acid. Crickets grown on any one of the diets contained significant quantities of the following minerals or trace elements: calcium (366-480  $\mu$ g per g dry weight), copper (8.5—9.2  $\mu$ g per g), iron (16.2-26.7  $\mu$ g per g), and magnesium (255-306  $\mu$ g per g). These data support the contention that crickets contain quantities of many nutrients that are essential to humans and show that the insect represents a commercially feasible source of food for human populations.

**BDB ref.:** BEDIM 543

*Thys, E. - Role of urban and peri-urban livestock production in poverty alleviation and food security in Africa*

**Source:** Académie Royale des Sciences d'Outre-Mer. Classes des Sciences naturelles et médicales, Mémoire in-8, Nouvelle Série, Tome 26, fsc. 1, Bruxelles 2006- 112 pp.

**Language:** English

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**Abstract :** Urbanisation is a world trend and demographers predict that in 2025, 65 % of the world population and approximately 50 % of the African population will be concentrated in towns. Predominantly rural in the past, Africa currently has the highest annual urban growth rate in the world. African urbanisation is not the consequence of an industrial revolution, as in other parts of the

world, but rather results from rising levels of health among urban dwellers. The economy is characterised by trade and crafts more than by industry, and there is a very large and growing informal economy. However, over the last decade, as a result of economic crises and the subsequent implementation of Structural Adjustment Programmes, this emerging sector has been ravaged. This has resulted in urban poverty severe enough to jeopardise livelihoods as well as food and nutrition security in most of the towns. Alternative food supply sources, such as home production and participation in public and household-to-household transfers, are therefore playing an increasingly important role among the survival strategies of poor urban inhabitants.

As well as agriculture, livestock is of great importance for developing countries in the context of food safety, and the provision of quality protein food to the populations. Since the beginning of the nineties, numerous publications have highlighted the fact that the number of animals kept in towns in these countries is considerable. Apart from the emergence of the industrial livestock sector, animals are also present in the city at household level for social security and economic purposes. Eventually, the side effects of this phenomenon on the environment and on human and animal health have come to concern professionals and urban planners. They have also focused on the technical aspects of animal husbandry and the issue of economic viability in the urban context. The aim of our research was to study this phenomenon and its secondary effects in Africa through the available literature, and the implementation of our own surveys, principally in Ouagadougou (Burkina Faso) and Brazzaville (Congo).

Livestock production inside city boundaries is, like urban agriculture, a very old phenomenon. Cities have always needed to secure their source of proteins and other animal products and by-products. The presence of backyard animals was a common phenomenon, even in Western countries until quite recently.

The study showed the complexity of the situation regarding urban and peri-urban livestock production, which comprises a wide variety of species, breeds and forms of production, ranging from the simple ownership of animals to industrial systems. Milk production, using dairy cattle, is the most widespread practice, as the product is highly perishable and the proximity of the production plots is a guarantee of freshness for the customer. This is the same situation for camels. Two cases of cow's milk production are described in West Africa (boxes 1 and 2). Urban sheep and goat production is traditionally linked to the custom of sacrificing animals for religious feasts, including the well-known Moslem Sheep Festival, and to savings. The case of Maroua, Cameroon (box 3) and Maradi (box 4) give more details about the importance of small ruminants in mid-sized towns. Backyard poultry is very common, but also large-scale units producing eggs and meat. Box 5 illustrates small-scale commercial production of

broilers in Yaoundé, Cameroon. Pig production remains marginal in most parts of the African continent, due to the important constraint of African swine fever, except in a few countries such as Nigeria, Madagascar or South Africa. Finally, in addition to those already mentioned, most other domestic animal species are to be found in towns: birds (ducks, guinea fowls), guinea pigs, and rodents including rabbits and the great cane rat.

The sector is facing a wide range of difficulties arising from the urban context in which it has been evolving, including feed problems, lack of space, lack of services, etc. However, in spite of producing various negative effects, such as pollution, roaming in the streets, and so on ... urban livestock production presents significant social, environmental and economic opportunities and benefits.

The importance of livestock production as a survival strategy for poor urban dwellers has been highlighted in our surveys in Ouagadougou (26.2 % of the households are practitioners) and Brazzaville (8.9 %). It is mostly people with previous experience in the field who are involved. The average profile of the current urban livestock owner in Ouagadougou is a person, usually a man, with previous experience in livestock, generally declaring himself to be a breeder and/or a cultivator, and having a household with more than 3 to 5 persons. The average profile of the current urban livestock owner in Brazzaville is a person who was involved with livestock before the 1997 war, and who occupies a compound larger than 388 m<sup>2</sup>.

Agriculture is more commonly practised than livestock keeping, but the latter is more important in cash generation. Another important point is that livestock is not necessarily combined with agriculture (mixed farming). Depending on the location, livestock is not combined with agriculture in 56,9 % of the households with livestock in Ouagadougou and in 37 % of those in Brazzaville. Livestock also has an important cultural and socio-religious role to play. The survey in Brazzaville also shows that urban livestock production is negatively influenced by conflicts and that it leads to a shift to smaller species, such as poultry and rodents.

The study focuses on the difference in perception between the authorities and those involved in livestock production, as well as between experts and producers. Public authorities are more sensitive to the negative aspects of the activity, such as lack of hygiene, road accidents, neighbourhood conflicts and damage to property. They seem to be particularly influenced by socio-economic factors, such as, for instance, the scale of the professional sector. Experts involved in research seem to be the persons most aware of the positive effects of urban livestock keeping. Aside from a concern with technical factors, the producers themselves seem to be especially worried about theft, which explains why, despite attempts to keep animals outside city boundaries, people seek to keep them inside their compounds.

The differences in viewpoint are clearly linked to conflicts between the perceived interests of the various stakeholders, in what is a complex context overall, and thus to a difference in opinion about the advantages of urban livestock production itself, as well as about the nuisances it entails. The study of manure management in Ouagadougou and Brazzaville provides an example of these divergent positions.

Urban livestock production has many interfaces and has to be considered in a broader urban-rural continuum, as illustrated in the framework drawn up on the basis of the study (figure 14).

The future of this evolving phenomenon seems to be dependent on the reconciliation of the various points of view involved, and on real and pragmatic consideration of the limitations of urban and peri-urban livestock production, and the nuisances it causes in terms of human health and urban hygiene. How these nuisances can best be controlled requires a common approach on the part of the various actors concerned, based on an accurate analysis of the objective facts. This should be taken into account when setting up city survival strategies so as to avoid a situation where urban livestock production remains stuck in the informal economic sector and in illegality. Figures are currently sufficiently strong to prove that urban livestock production is still a dynamic sector. No one knows when it may go into decline, but the important socio-cultural value attributed to animals in many African cultures will probably ensure that animals will be kept longer for that purpose than for food and income.

The aspect of the activity which seems least well documented, is that of the transmission of diseases to man. Indeed, although the theoretical model suggests that a high population concentration near animals and animal-based industries constitutes a potential danger to public health, experts who have been consulted on the matter seem to possess little information suggesting that cities are at a higher risk than rural areas. Nevertheless, this aspect is too important, ethically speaking, to be neglected.

**BDB ref.: BEDIM 541**

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