



Európska únia
Európsky fond regionálneho rozvoja

15. Years of Research in Industrial Dipterology at IZ SAS

15. rokov výskumu priemyselnej dipterológie na ÚZ SAV

Milan Kozánek & Michal Kozánek

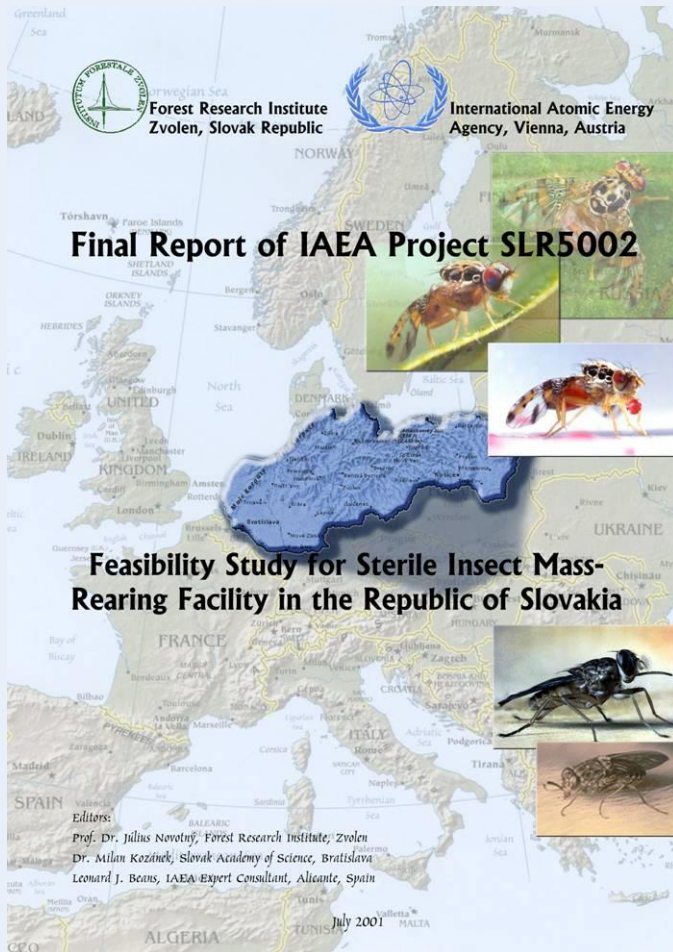
Institute of Zoology, Slovak Academy of Sciences

Scientica, s.r.o., Hybešova 33, Bratislava

**7th Central European Dipterological Conference, Ostrava,
Czech republic**

04.-06.09.2013

Beginning



- Assessment of the Commercial Feasibility of a Sterile Insect Mass Rearing Facility in the Slovak Republic

SIT and eradication of tse-tse flies

IAEA - UZSAS Contract No. 2002-1049

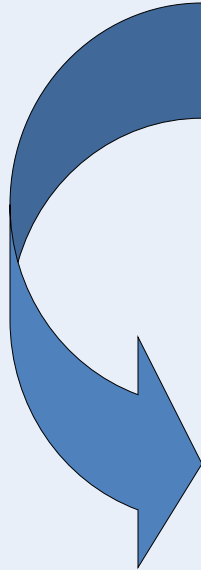
The provision of services for mass rearing and supply of tse-tse flies in support of area wide intergrated campaigns

(Vybudovanie záložnej kolónie na podporu tse-tse eradikačných programov v Afrike)

The Problem



Trypanosomes – protozoa



Human African Trypanosomosis



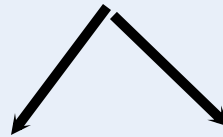
T. b. rhodesiense and *T. b. gambiense*



Animal African Trypanosomosis

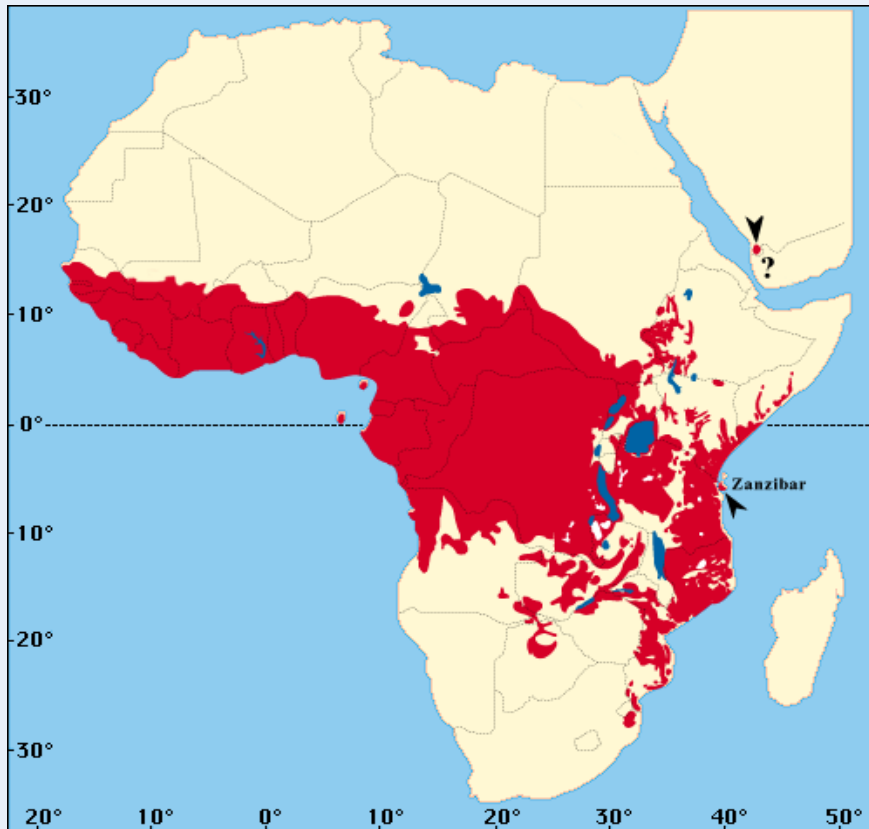


Trypanosoma brucei brucei



The problem

Distribution of *Glossina* spp in Africa



- The Tsetse fly - Africa's Bain
- 36 countries - 10 million km²
- 50 million cattle at risk
- Direct losses: US\$ 0.6 - 1.2 billion EACH YEAR
- 165 million cattle in Africa
- only 10 million in tsetse infested areas
- Responsible for separation of crop farming and livestock production
- 45,000 new cases of Human African Trypanosomosis

Facility at IZ SAS



Corridor

Chiller

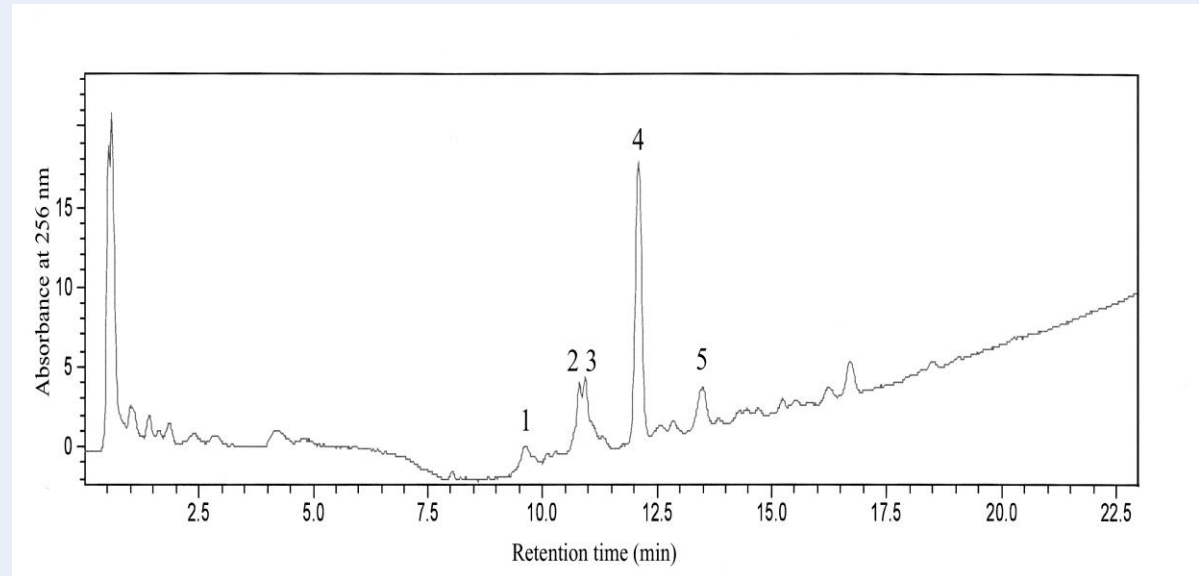
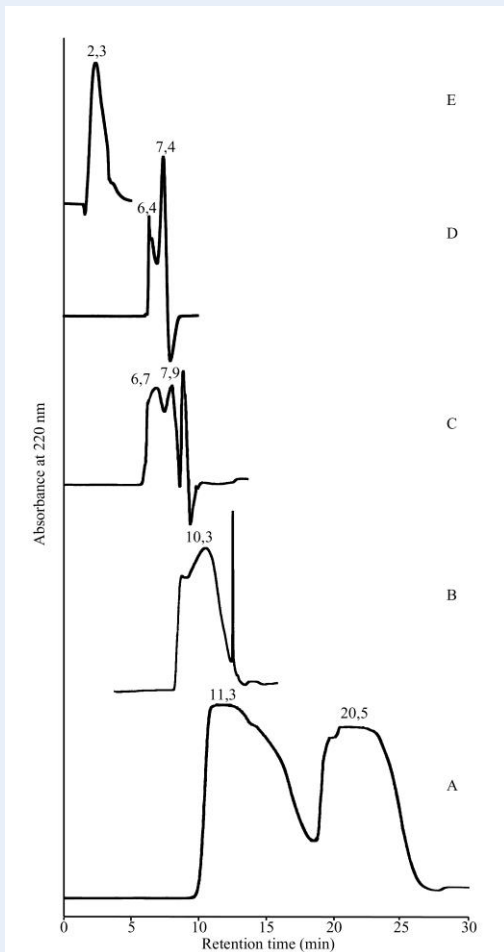


Rearing rooms



Feeding room

Tse-tse Reproduction Research



- **HPLC-MS TIC chromatogram showing the main components of the active fraction from the last RP-HPLC purification step. (The numbers indicate the peaks used for AA sequence analyses.)**

ECODIPTERA (EC – LIFE)

Implementation of a management model
for the ecologically sustainable
treatment of pig manure

*(Likvidácia biologických odpadov s využitím
lariev hmyzu)*

ECODIPTERA (EC – LIFE)

Musca domestica



 **Spoločné biotechnologické zariadenie**
EÚ - SAV - PD Úsvit
(Pracovisko Alžbetin Dvor)

 **Joint biotechnological facility**
EU - SAS - PD Úsvit
(Working place Alžbetin Dvor)



ECODIPTERA (EC – LIFE)



PRED

PO



Maggot Debridement Therapy

Mechanism of Action

- Enzymatic debridement of necrotic tissue
- Antimicrobial molecules produced by larvae
- Cytokins and growth factors
- Improvement of blood circulation
- Metabolic action of *Proteus mirabilis*

Maggot Debridement Therapy

Indications

- Broad spektrum of non healing wounds
- Neuropatic and ischemic ulcers
- Pressure ulcers
- Venous ulcers
- Traumatic non-healing wounds
- Burnings

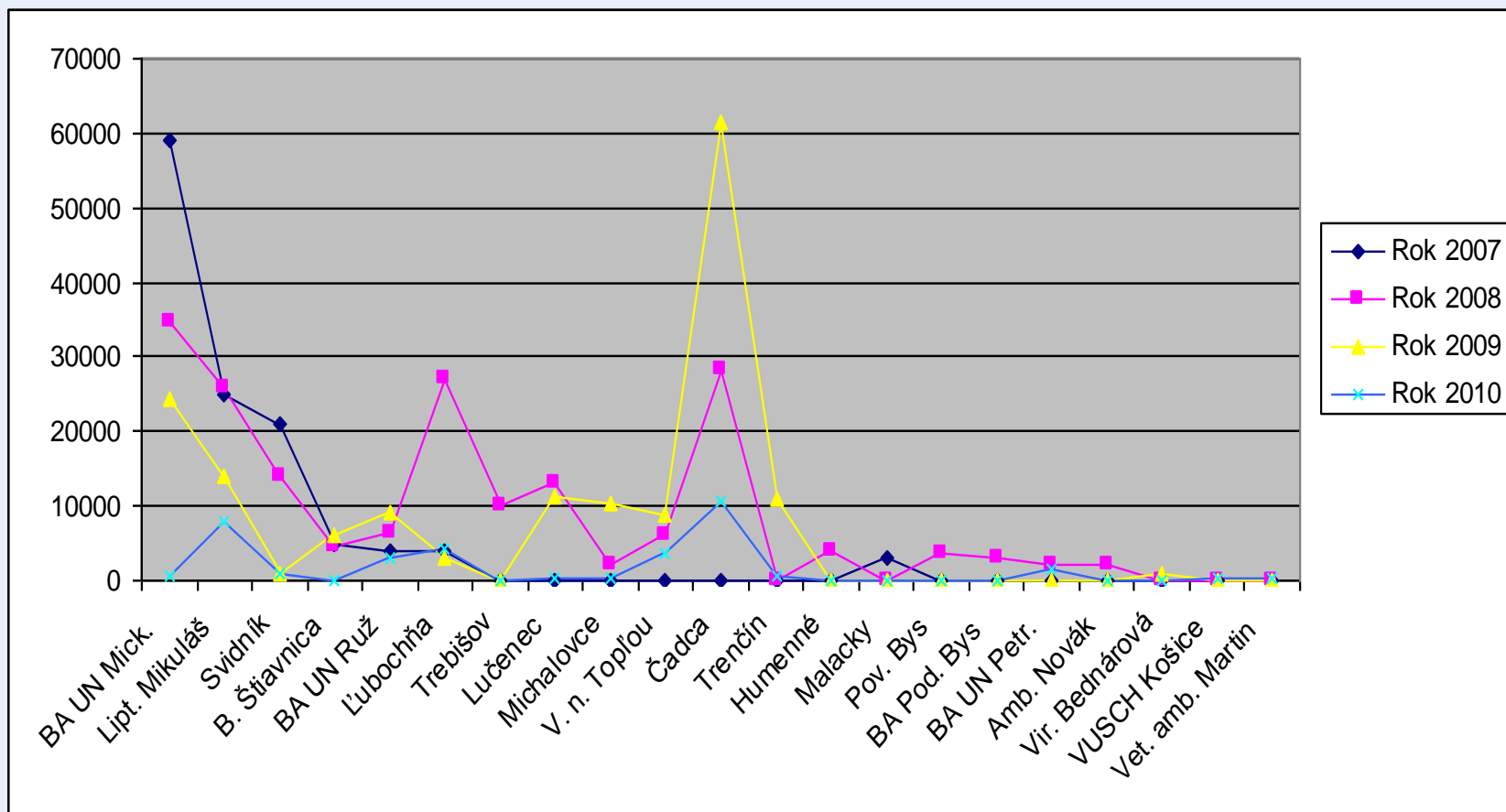
Clinical Facility in Military Hospital in Bratislava



Maggot Debridement Therapy



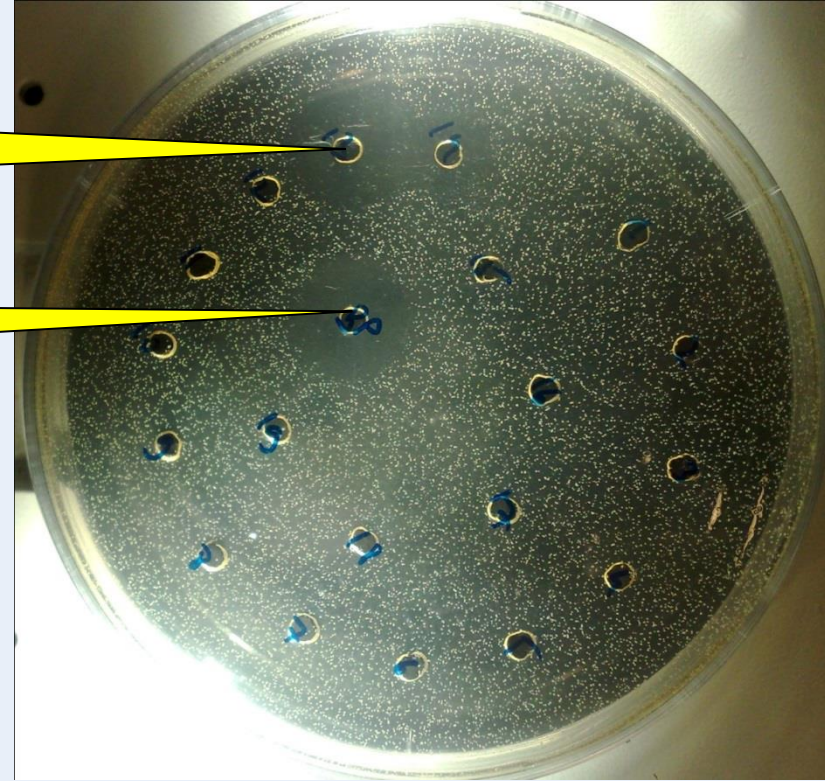
Cooperating Hospitals in SR



Biomolecules from saliva of *L. sericata*

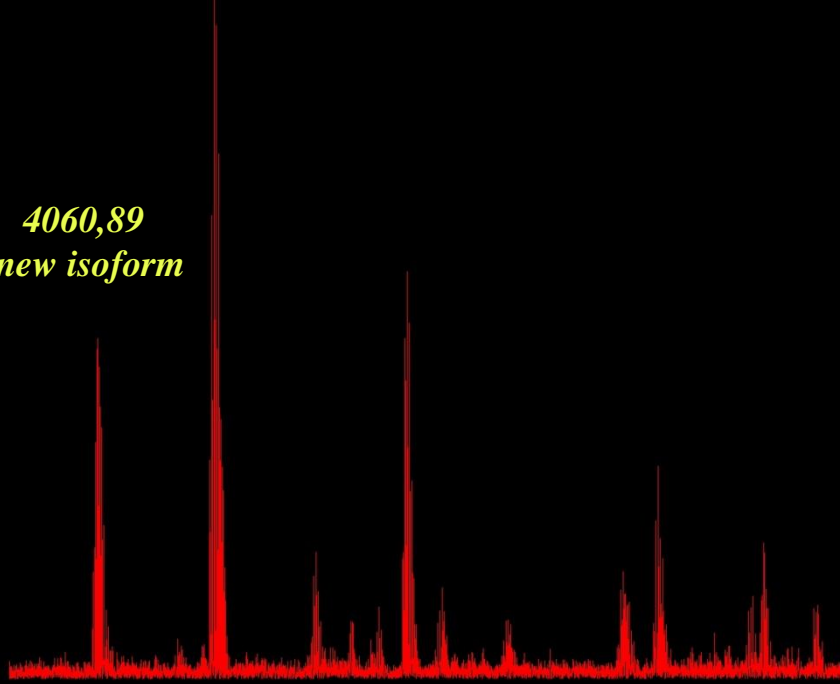
*5 μ l of HPLC
fraction
R.t. 44,5 min.*

*5 μ l of sample before
HPLC purification*



4114,89 LUCIFENSIN

*4060,89
new isoform*



Transfer of biotechnologies based on industrial dipterology in Kenya

- Extension of KARI-TRC tse-tse mass rearing facility producing sterile males for tse-tse eradication programs in Kenya (SlovakAid)
- Introduction of MDT to medical and veterinary clinical praxis in Kenya (SlovakAid)

Tse-tse facility





Some of the patients in the mission hospital



Current status

- Capacity for production of sterile maggots exists.
 - 2 other members of staff have been trained locally
- Market for the sterile maggots exists.
- Inquiries are coming into the lab



New cages in the insectary



Fridge and freezers in the washroom.



Hood in the sterile maggot preparation room

Commissioning of MDT Facility



Industrial Dipterology – Challenges

- The research of new ways of using flies in biotechnologies
- New methods of mass production
- New products and their derivatives
- Development of new strains for special production purposes

This research had been funded by the Operational Program of Research and Development and cofinanced with the European Fund for Regional Development (EFRD), Grant No. ITMS 26240220030: **Research and development of new biotherapeutic methods and their application in the treatment of some illnesses.**



Podporujeme výskumné aktivity na Slovensku/Projekt je spolufinancovaný zo zdrojov EÚ“.

Thank you for your attention

