INNOVATION PROJECT
MEDICINAL LEECH (HIRUDO MEDICINALIS) ARTIFICIAL BREEDING AND CULTIVATION

I. PROJECT INFORMATION

1. Introduction

Project goal—organization of industrial cultivation of medicinal leech (*hirudo medicinalis*), through artificial breeding and maintenance.

2. Review of Medicinal Leech Uses and Current State of its Production

Medicinal Leeches have been approved by the Food and Drug Administration (FDA) to be used and marketed for medical purposes. The medicinal leeches have been classified as a medical devise by FDA.

Medicinal leech is used in hirudotherapy for efficiently managing a wide spectrum of human diseases:

1) Cardiovascular diseases:
   coronary disease
   heart failure
   hypertension
   varicosis
   thrombophlebitis

2) Nervous system diseases:
   concussion of the brain
   pre-stroke state and stroke
   polyneuritis
   facial paralysis and facial neuritis
   radiculitis

3) Oral cavity and digestive system diseases:
   parodontosis
   gingivitis
   stomatitis
   cholecystitis
4) Urological diseases:
cystitis
urethritis

5) Gynecological diseases

6) General Surgery diseases:
Hemorrhoids
panaritium
appendicitis (not acute form)
postoperative complications
hemorrhages
transplantations

7) Ophthalmologic diseases:
glaucoma
cataract
iridocyclitis

8) Dermal diseases

9) Joint diseases

It is only a part of the complete list of diseases that are effectively treated with hirudotherapy. Medicinal leech (hirudo medicinalis) could also serve as a raw material for receiving substances for production of medicinal products including oral preparations, ointments and eye drops.

Medicinal leech is used for production of substances used for cosmetic products (creams, gels, etc.).

Medicinal leech could also be used as live bait in amateur and sport fishing.

Lastly, medicinal leech is used for educational purposes at biology departments of different educational institutions.

Even water where leeches live (when it is replaced during the production process) is an excellent liquid fertilizer for room and garden plants.

Nowadays, medicinal leech catching is prohibited. The only way to use it for the above stated purposes is to artificially breed it.

There are several established production factories for medicinal leeches in the world.

In Russia:
1) Bioplant in Udelnaya settlement, Moscow region (International Center for Medicinal Leech, Ltd.).
2) A. S. Zalmanov medical company (Bioplant for Medicinal Leech Rearing) in St. Petersburg.
3) Hirudo-Med LLC, Moscow region, Lyubertsy.

In Ukraine:
1) Biokon JSC Bioplant in Donetsk.
2) Individual proprietor M. A. Kitsai, Lvov

In Great Britain:
1) Biopharm company

In France:
1) Recarimpex company, Bordeaux.

In Belarus:
1) Individual proprietor E. A. Zuperman, Minsk. In 2014 Mr. Zuperman started working on setup of the medicinal leech artificial breeding in the USA.

Medicinal leech is also cultivated under artificial conditions in Kazakhstan, Turkey, and other countries. The World Society of Hirudologists was established in 1990. And American Hirudotherapy Association was founded in 2012.

The above mentioned production runs use various technologies (or partial syntheses of the same) for breeding medicinal leech. For example, the so-called “tin” technology or the “closed cycle” technology can combine various technologic modes of rearing in artificial water basins.

All the above mentioned methods allow to solve problems of supplying hospitals with medicinal leech for treatment purposes, as well as to fulfill the raw base needs for producing cosmetics and products containing biologically active substances extracted from medicinal leeches.

One very important aspect of medicinal leech breeding is that it makes it possible to save these species from absolute extinction in nature due to illegal catching of the wild leech. It positively
affects the ecological state in the areas where the medicinal leech dwells as well as the whole ecosystem.

It is well-known fact that the man began using medicinal leeches for therapeutic purposes at least three thousand years ago in Ancient Egypt. The healing effect of such usage has been confirmed by the millennial experience. Today a wide use of medications results in numerous side effects. In contrast, hirudotherapy has almost no side effects. Among alternative methods of treatment, hirudotherapy is a unique method of treatment since it uses a living organism, the method that has been used for ages with proven results.

II. PROJECT'S EXPECTED IMPACT ON PROGRESS OF MEDICINAL LEECH BREEDING IN THE USA AND ITS PRACTICAL APPLICATIONS

Currently the medicinal leech breeding in captivity is non-existent in the USA. This is the major roadblock for future development of hirudotherapy there. Naturally, all other related methods that use the leech as raw material are not progressing as well.

Use of imported medicinal leech (from wholesale companies) has its negative aspects such as:

1) Hirudotherapists and other medical specialists using medicinal leech cannot directly work together with medicinal leech producers (or their cooperation is difficult). Especially when it is necessary to discuss the required physical characteristics of this therapeutic organism (leech mass, fasting period, etc.) and the delivery terms.

2) Lack of means to control the medicinal leech production in the supplier’s country by FDA.

3) Difficulties with importing leeches such as:

- Obtaining permission from the CITES administrative body in the exporting country to export a CITES object.
- Problems with air transport, natural disasters, political or economic instability in the supplier’s country.

In the last decades use of medicinal leeches in therapy (hirudotherapy) has been given a renewed momentum, especially in the countries having centuries-old historical traditions using medicinal leeches.

The realization of this project will allow development of hirudotherpay and other applications of medicinal leeches in the US.
III. PROJECT INITIATOR’S COMPETENCIES

The project initiator is Efim Zuperman, a sole proprietor, who has been producing (breeding) medicinal leeches for over ten years.

During this time Mr. Zuperman has supplied medicinal leeches to a variety of customers:

A) State health institutions;
B) Medical clinics practicing hirudotherapy.
C) Individual physicians;
D) Department of Biology at the Belarus State University;
E) Minsk City Executive Committee, Department of Education;
F) Private customers (in accordance with the applicable legislation).

Mr. Zuperman has developed various proprietary techniques and special technological equipment for breeding medicinal leech. His official status of a medicinal leech producer was granted by the Institute of Zoology, a state agency of the National Academy of Science of Belarus, on June 5 2006. (See Addendum I)

Mr. Zuperman’s official status of a medicinal leech producer is also supported by Certificate of Registration of Wild Animals Included in Belarus Red List of Endangered Species, or Being CITES Specimens that are Kept and Reared in Captivity, issued by the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus in accordance with the Wildlife Protection Law of the Republic of Belarus on December 28 2009. (See Addendum II)

IV. GOALS FOR THE SUCCESSFUL ROLLOUT OF THE PROJECT:

a) Obtaining project funding.
b) Establishing manufacturing sites complying with the specific conditions and expected initial volume of production.
c) Purchasing necessary technological equipment, inventories, and raw materials.
d) Assembling, and adjusting technological equipment.
e) Achieving necessary production volume.
f) Training employees to take care of leeches.

Thank you for your attention and consideration.

Sincerely,
Efim Zuperman
361 Town Place Circle, Buffalo Grove IL 60089  Direct ph#: 847-971-4046
E-mail: Efimleeches@gmail.com
Supporting Research and Literature:

Addendum I

TRANSLATION OF ORIGINAL DOCUMENT

NATIONAL ACADEMY OF SCIENCES OF BELARUS
INSTITUTE OF ZOOLOGY
State Scientific Institution
27 Akademicheskaya Str., Minsk 220072
Tel.: 284-15-93; fax: 284-10-36

05.06.2006 No. 126-436
Ref. No. 126-273 of May 24, 2006

Individual owner E. A. Zuperman
Registration Certificate No. 190387133
of 11.09.02
11 – 7 Zolotaya Gorka Str., Minsk
Tel.: 293-72-63

DECISION

Commission consisting of V. M. Baichorov (Head of Laboratory of Hydroecology), doctor of Biology, R. V. Novitsky, Research Scientist of Laboratory of Theriology, member of CITES Research Body in the Republic of Belarus, and individual owner E. A. Zuperman residing at 11 – 7 Zolotaya Gorka Str., Minsk, has drawn up this statement regarding the following: the Commission has inspected the conditions of the medicinal leech (Hirudo medicinalis), the CITES object, keeping and rearing under the artificial conditions and concluded the following:

1. The conditions arranged for the medicinal leech breeding, long-time support of the population and a successful rearing were acknowledged to be satisfactory.
2. Based on the evidence of successful rearing (dry capsules from earlier generations, live capsules at incubation, young leeches, mature leeches, aquariums, feeding troughs, special equipment for leech breeding, etc.) the Commission has concluded the following: medical leeches have been kept and reared successfully for a long time (not less than for a year) under artificial conditions.

Annex
1. Application for inspection sent to a CITES Agency.
2. Copies of the contract and invoices for purchasing medicinal leeches.
3. Copy of the letter from the Ministry of Natural Resources and Environmental Protection No. 06-01-11/918 of 07.04.206.
4. Copy of the Ministry of Public Health license No. 63 of 03.04.1992 issued to individual owner B. E. Sheshko who supplied the initial specimen for breeding.

Commission
Head of Laboratory of Hydroecology, Doctor of Biology (Signed) V. M. Baichorov
Research Scientist of Laboratory of Theriology, member of CITES Research Body Commission (Signed) R. V. Novitsky
Individual owner (Signed) E. A. Zuperman

Stamp: I, Chief Inspector of Human Resources, certify V. M. Baichorov and R. V. Novitsky signatures. Chief Inspector of Human Resources (Signed)
Addendum II

*TRANSLATION OF ORIGINAL DOCUMENT*

MINISTRY OF NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION
OF THE REPUBLIC OF BELARUS

CERTIFICATE

Of Registration of Wild Animals Kept and (or) bred in captivity that are Included in the Red List of Endangered Species of the Republic of Belarus, or belong to the CITES Species

Date of issuance: 28.12.2009
Number: 000341

Issued to [full name of legal person]

_________________________ Efim A. Zuperman
Forename, patronym, surname of a person including individual owner

11 – 7 Zolotaya Gorka Str., 220005 Minsk, tel. 293-72-63
Address, telephone and fax numbers

In confirmation that medicinal leech (Hirudo medicinalis)
Wild animal Russian and Latin name

Number of animal units, age, and gender: 4500 units, bisexuals, age – 3 months to 4 years

Registered on December 28, 2009 under No. 326.

Deputy Minister (signed) A. V. Lis

Seal: Ministry of Natural Resources and Environmental Protection of the Republic of Belarus

*Original documents can be presented upon request