Malaysia_Sarah

Malaysia_Sarah

O_Taiwan_Andrew Fei

Hirofumi Kugita_OIE R...

Kinzang Dukpa_OIE

WELCOME

OIE Virtual Workshop on Oral Rabies Vaccines (ORVs)

Monday, 28 February 2022, 3 PM – 6 PM JST (GMT+9)

OIE

Organisation Mondiale de la Santé Animale

World Organisation for Animal Health

Organización Mundial de Sanidad Animal

Recording

AGENDA and Speakers

Topics	Speakers
Oral rabies vaccines (ORVs) and its usage in controlling sylvatic rabies - Dog-mediated rabies versus wildlife mediated rabies - Concept of ORVs and usage in elimination of sylvatic rabies in Europe - OIE's Standards on ORVs - ORVs and ORV baits: production and supply issues	    Conrad Freuling Thomas Muller Gregorio Torres Ad Vos
Q&A and Health break	

AGENDA and Speakers

Topics	Speakers
Potential role of ORVs in control of dog-mediated rabies in Asia - Status of use of ORVs in AP region - Proof of concept of ORVs for use in dogs - Which ORV baits suits the most for dogs in Asia - Field experiences on safety and efficacy of ORVs in dogs	 Ryan Wallace  Andy Gibson  Kansuda Leelalapongsathon
Q&A Session	

Objective of the workshop

- To introduce the use of ORVs to eliminate rabies in sylvatic cycle.
- To know if any country interested to start pilot project for ORVs in Asia Pacific region for rabies elimination in free roaming dogs.

Key objectives

- To understand if Members have used or intend to use ORVs in dogs to complement parenteral rabies vaccination program
- To understand, for countries interested to use ORVs for their animal rabies control program, what support is expected from the OIE to implement such initiatives.

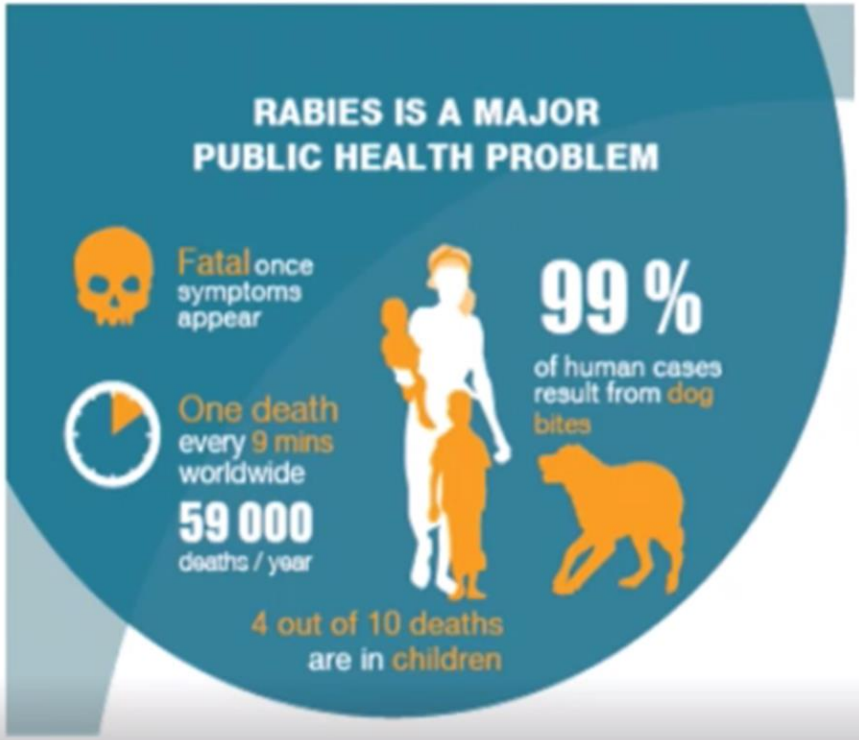
INTRODUCTION: RABIES

Dog-mediated rabies ?

Wildlife rabies ?

Free roaming dogs are important reservoir for rabies.

- Dog-mediated rabies should be the focus of any intervention!



ORVs can complementing parenteral vaccine

The concept of oral rabies vaccination in wildlife and experiences in control of sylvatic rabies in Europe

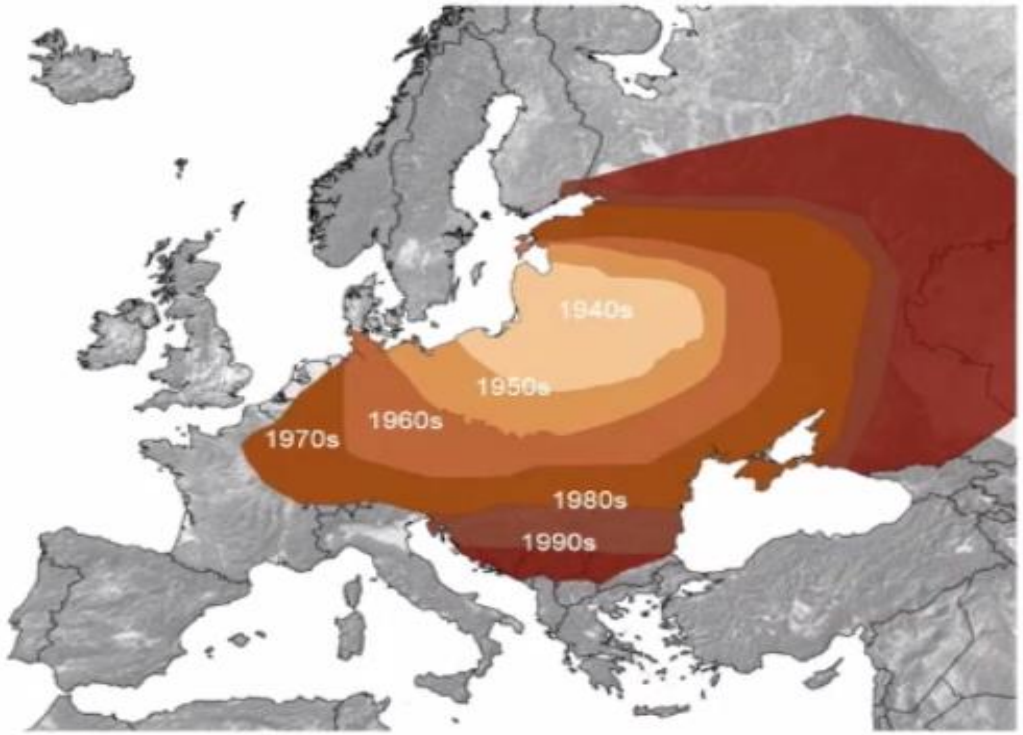
Thomas Müller
Conrad Freuling
Ad Vos

Large Variety of Reservoir Species

Source: Friedrich-Loeffler-Institut, 2022

FRIEDRICH-LOEFFLER-INSTITUT

Example fox mediated rabies



Conventional rabies control =
Decimation of fox population

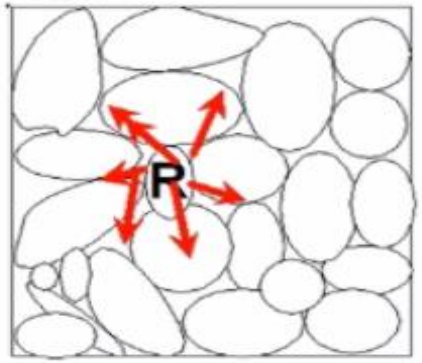
- Culling
- Trapping
- Poisoning
- Destruction of fox cubs

ineffective

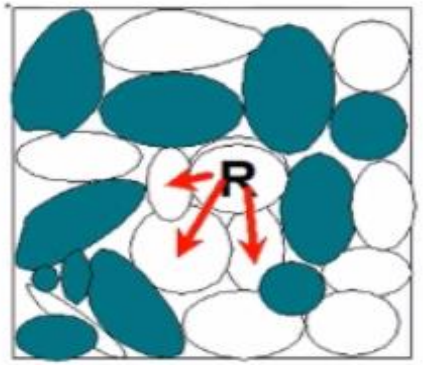
Source: Friedrich-Loeffler-Institut, 2022

Only Solution

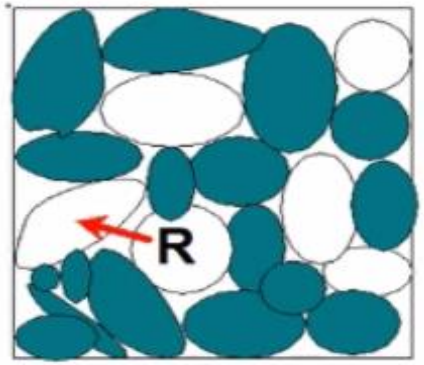
Susceptible



Immune barrier



Protected



modified from Aubert 1992

Basic principles

- Biology of target species
- Safe & efficacious oral rabies vaccines
- Suitable baits
- Size of vaccination areas
- Timing of ORV campaigns
- Bait density
- Mode of bait distribution
- Duration of vaccination
- Surveillance and Monitoring

Baits – OIE Requirements & Characteristics

- designed for & attractive to target species
- be safe for target & non-target species
- no interference with vaccine activity
- easy ingestion by target species
- optimal release of vaccine into oral cavity
- adapted to mode of distribution
- allow incorporation of a biomarker
- be economic to produce in standard form

OIE Terrestrial Manual, 2022

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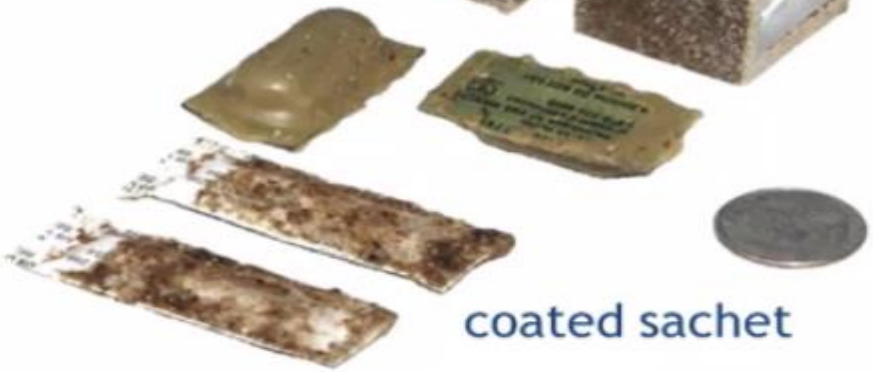
Note: - No bait fits all species!

fish meal polymer



coated sachet

fish meal parrafine

Source: Richard Chipman, USDA Wildlife Services, REDIPRA 16 - Nov. 2017; courtesy Ad Vos

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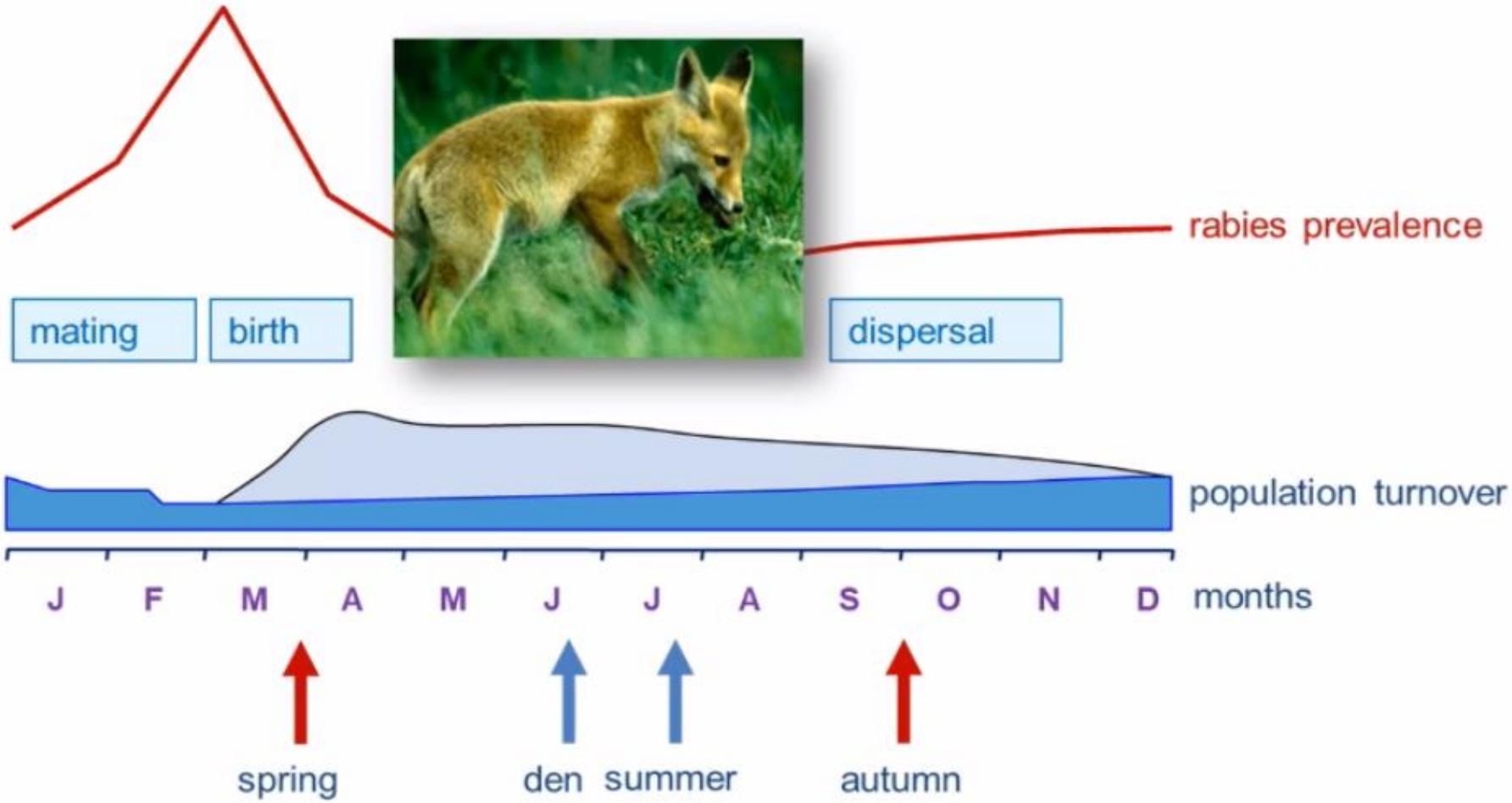
Timing of campaigns



Source: Friedrich-Loeffler-Institut, 2022

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Mode of bait distribution

	Hand		Aerial	
Organizational effort	👎		👍	
Manpower	👎		👍	
Urabn/subarban settings	👍		👎	
Suitability for large-scale vaccination	👎		👍	
Coverage of hard-to-reach areas	👎		👍	
Cost-effectiveness	👎		👎	
Monitoring of campaigns	👎		👍	

Note: hand and aerial distribution complement each other

Source: Friedrich-Loeffler-Institut, 2022

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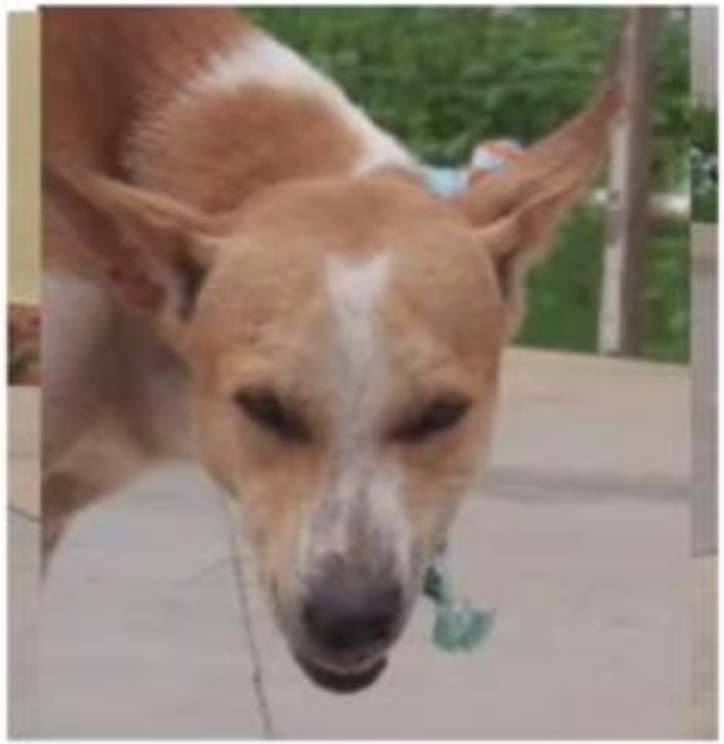
Recording
After dropping the bait move some distance
away to observe the dog as it consumes the bait

KEY POINTS:

- KEEP WALKING
- AVOID EYE CONTACT
- TOSS UNDER-ARM
- LAND BAIT IN FRONT OF DOG
- OBSERVE FROM A DISTANCE
- COLLECT REMNANTS

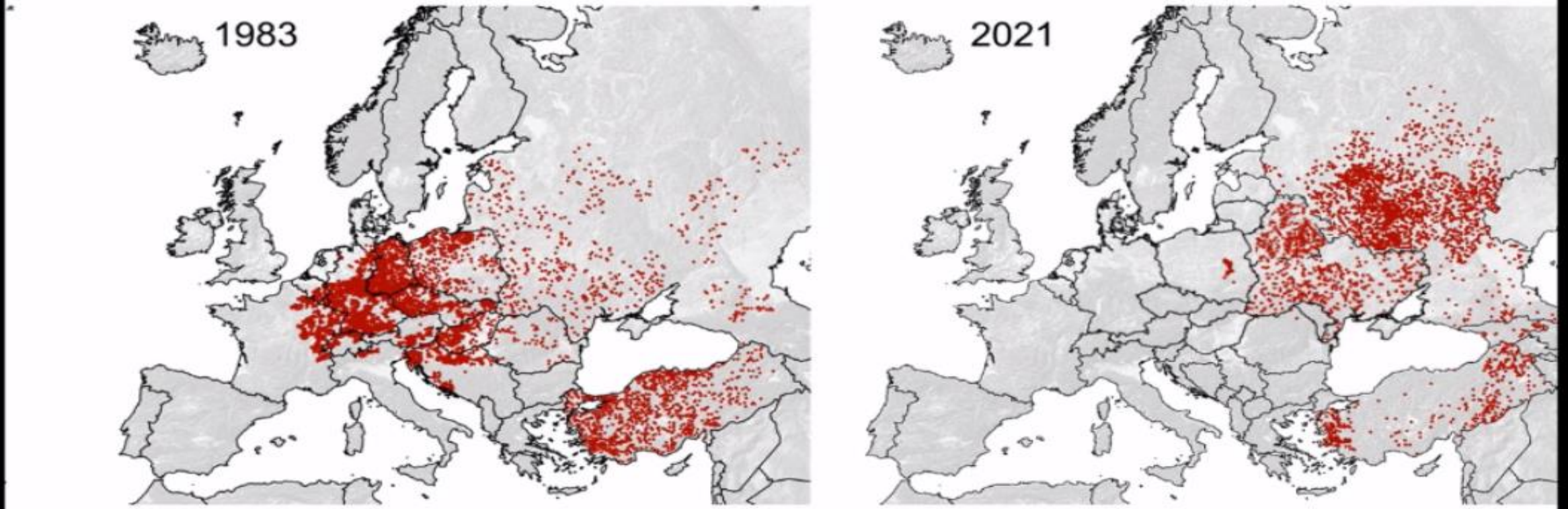


Source: Ad Vos, Ceva

Key messages

- Large scale > 5,000 km²
  - Aerial & complementary hand distribution
  - 25 baits / km², cross border coordination
- Long-term 6 y + 2 y
  - Timing of campaigns: twice a year (spring /autumn)
  - Duration of campaigns: Average 6 y
  - Cessation of campaigns: 2 y after last rabies case
- Targeted rabies surveillance & monitoring of campaigns
  - Rabies prevalence, bait-uptake, seroconversion
  - Epidemiological analysis

See the difference!



Müller and Freuling, 2020, FLI, 2022

Terrestrial Manual Chapter 3.1.17

‘ Parenteral vaccination of dogs should remain the foundation of mass vaccination campaigns. […] the use of oral vaccination, especially in free-roaming and inaccessible dogs, […], should represent a complementary measure for the improvement of the overall vaccination coverage. For ORV of dogs, the handout and retrieve model should be used’

Part C: Requirements for vaccines

Rabies vaccine for oral use

- Minimum requirements
- Regulatory approval
- Efficacy requirements
- Stability
- Bait requirements and characteristics

OIE endorsement of official control programme for dog-mediated rabies

For Members to progressively improve their dog-mediated rabies situation and eventually make a self-declaration as a country free from dog-mediated rabies.

https://www.oie.int/en/what-we-do/animal-health-and-welfare/official-disease-status/

ORV of dogs: vaccine & baits
Production and supply experience in Asia

Ad Vos

OIE Workshop on ORV of dogs in Asia, 28th February 2022

Oral vaccination of dogs against rabies

Several countries in the region have already conducted field trials, among others:

- Sri Lanka
- Thailand
- India
- Indonesia

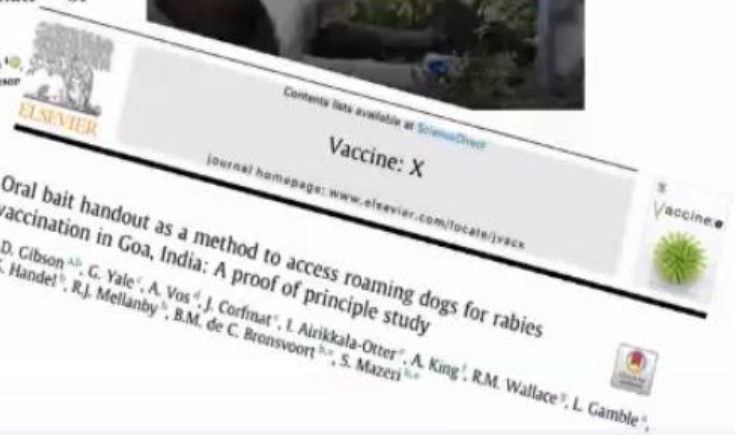

Feasibility of canine oral rabies vaccination in Sri Lanka - a preliminary report

viruses

MDPI

Article

Feasibility and Effectiveness Studies with Oral Vaccination of Free-Roaming Dogs against Rabies in Thailand



So, where do these countries get these vaccine baits from, as there is no local production in South & Southeast Asia?

Oral vaccination of dogs against rabies: production

The vaccine baits were imported, but …

None of the commercial available oral rabies vaccine baits are produced in countries with dog-mediated rabies and thus are only licensed for certain wildlife species and not for dogs

- *Certificate of Free Sales not an option*

Annex 10. Currently available oral rabies vaccine products

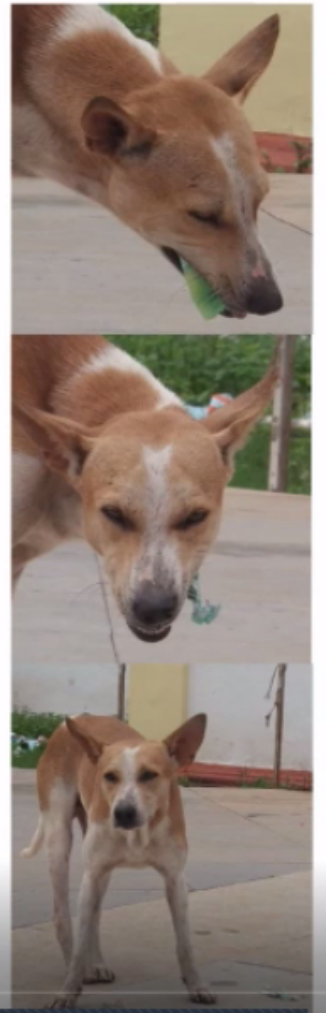
Vaccine strain	Product name or brand name	Formulation	Vial size	Company	Country
SPBN-GASGAS	IDT Biologika	RABV	3rd	Reverse genetics with site-directed mutagenesis	Licensed for wildlife
ERA G333	Prokov	RABV	3rd	Reverse genetics with site-directed mutagenesis	Licensed for wildlife
SAG2*	Virbac	RABV	2nd	Monoclonal selection mutant	Licensed for wildlife
SAD B19	IDT Biologika	RABV	1st	Serial (passaged in vivo/in vitro)	Licensed for wildlife
SAD Bern	Bioveta	RABV	1st	Serial (passaged in vivo/ in vitro)	Licensed for wildlife
RB-97	FGBI "ARRAIH"	RABV	1st	Serial (passaged in vivo/ in vitro)	Licensed for wildlife
VRC-RZ2	No information	RABV	1st	Serial (passaged in vivo/ in vitro)	No information
KMIEV-94	No information	RABV	1st	Serial (passaged in vivo/ in vitro)	No information
V-RG*	Merial	Vaccinia virus		Recombinant, expressing rabies glycoprotein	Licensed for wildlife
AdRG1.3	Artemis Technologies	Adenovirus		Recombinant, expressing rabies glycoprotein	Licensed for wildlife

Oral vaccination of dogs against rabies: supply

Importation of vaccine baits

But under which premises?

- it first has to be licensed for dogs before it can be used, or
- it can enter the country with a special import permit, or
- it must (partially) be produced locally …



Oral vaccination of dogs against rabies: production

The three components:

1. Vaccine

2. Sachet

3. Bait

Oral vaccination of dogs against rabies: Supply & Production

As local production is technically and commercially not (yet) feasible, vaccine baits need to be imported

Licensing is often a long and arduous process in some countries, jeopardizing the goal '0 by 30'
(e.g. India – stability data available prior to dossier submission)

Importation through (special) import permit and use under governmental supervision is presently the only option

However, even a special import permit is not always easy to obtain ....
Key problem is the uniqueness of product
„it doesn't fit in well with other vaccines"

Oral vaccination of dogs against rabies: Import

The importation process can be further complicated by issues associated with, e.g.:

- Type of vaccine (live, GMO)
- Bait ingredients and origin

联合国粮食及农业组织
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
ORGANISATION DES NATIONS UNIES POUR L'ALIMENTATION ET L'AGRICULTURE
ORGANIZACION DE LAS NACIONES UNIDAS PARA LA AGRICULTURA Y LA ALIMENTACION
منظمة الأغذية والزراعة للأمم المتحدة

EMERGENCY CENTRE FOR TRANSBOUNDARY ANIMAL DISEASES

Date : 8 September 2020
Ref : EC501.025/FAO ECTAD/Progs/09/2020
Attachment : -
Subject : Oral Rabies Vaccine (ORV) initiative in Indonesia

To whom it may concern

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Website : http://www.ditjennak.pertanian.go.id

Jakarta, 10 Mei 2021

Nomor : B.10.001/IU.020/F5/05/2021
Hal : Pemasukan Umpan Vaksin Oral

Kepada:

Conclusion

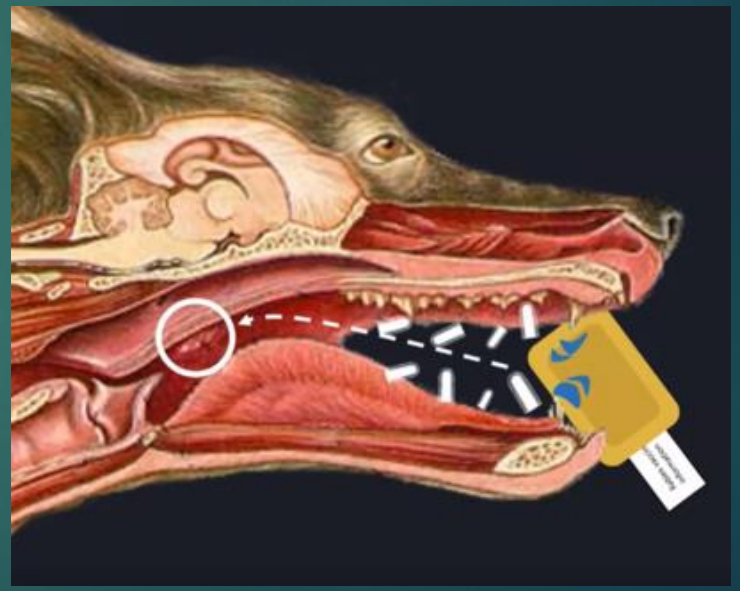
Procurement and importation of vaccine baits is challenging but with strong local and international support of key stakeholders it is manageable and makes ORV of dogs locally feasible

Some important additional information on ORVs

- @Sarah: Vaccinators offering baits to wildlife or dogs should receive preventive rabies vaccination. As most People in the community will not come into contact with vaccine baits there is no need to vaccinate community people. As far as ORV of dogs is considered the OIE requires a safety risk assessement for humans.
- ORV can be introduced under PPP framework for effective use and more efficacy
- Wildlife to domestic dogs or vice versa could be attributed to deforestation leading to close proximity of villages with forest. This leads to movement of wild carnivores into villages and vice versa.
- The shelf-life of oral rabies vaccines in the environment is temperature dependent. The higher the temperatures the shorter the shelf-life. Usually, the shelf-life of the vaccine should be balanced to allow target species to locate baits in the field (up to two weeks).

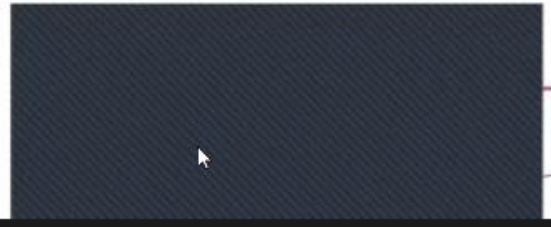
- @Sarah: weather conditions may not impact the vaccine directly but the bait Matrix. High temperatures or hard rain may results in the melting or washing away of the bait matrix and hence, expose the blister containing the vaccine to direct sunlight, which will result in rapid decline of vaccine titre. Therefore, Determination of the best timing of campaigns considering weather conditions is crucial.

- @Tippawon: vaccination coverage in wildlife can be monitored by the detection of tetracycline (tetracycline is a bait marker) in tooth and bone tissues (bait-uptake) and/or detection of rabies specific antibodies using serological assays.



Support envisaged from OIE to pursue piloting of ORVs

- Vaccine supplies, technical support
- Training on actual usage of ORVs and ORV baits
- Support on safety assessment and efficacy
- Liaising with international experts for expert advise
- Guidance for post-vaccination monitoring
- Advocacy with government authorities for use of ORVs and licensing/import of ORVs



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How do baits compare?

- Chew
- Take into mouth
- Interested in bait
- Baits dropped

CONCLUSION

- Oral rabies vaccines are NOT new
- Parenteral vaccination is always preferred, if your dog population is accessible
- Not all oral rabies products are equal – international agencies need to do more to recognize well-studied products
- Chicken or Egg? What is the incentive to make ORV, if no country is asking for it?
- Who is going to pay for it?