



GF-TADs

GLOBAL FRAMEWORK FOR THE
PROGRESSIVE CONTROL OF
TRANSBOUNDARY ANIMAL DISEASES



Oie

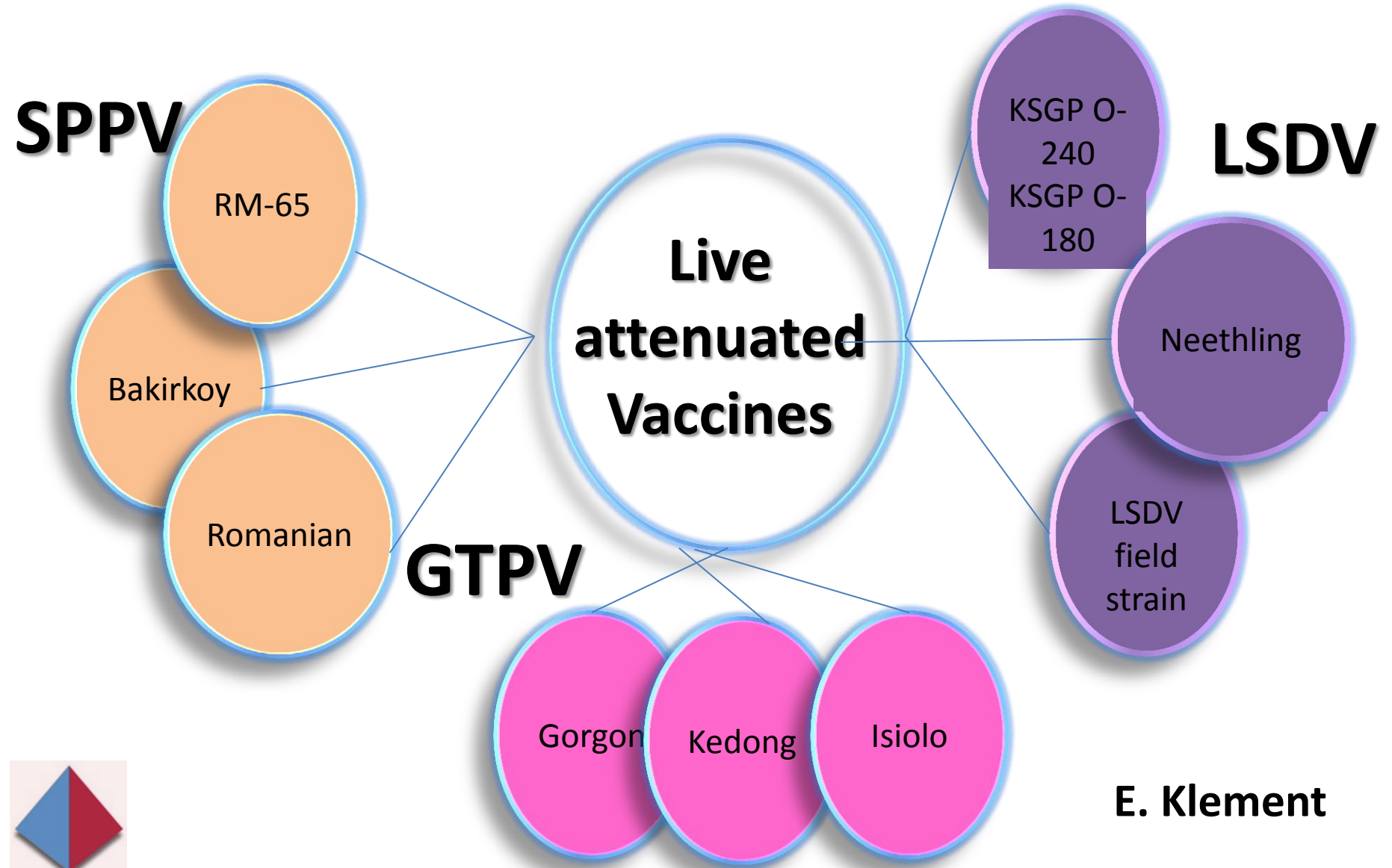
HOMOLOGOUS VS HETEROLOGOUS LSD VACCINES PRO's and CON'S

Nadav Galon
CVO, ISRAEL
(LSD3)

Istanbul, Turkey, 12-13 December 2016



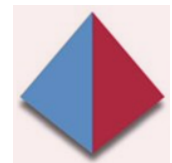
Existing vaccines against LSDV



The real questions are...

- Effective or not-effective vaccine
 - No perfect vaccine- Effectiveness is Relative
- Confounders
 - Epidemiology
 - entomology
 - Culling
 - Believes vs facts
- Differentiate Vaccine and vaccination

FACT-DRIVEN



What makes a vaccine good?



Field efficacy studies

Challenge studies

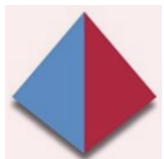
Field experience

GMP

Adverse effects

Reversion to virulence

GOOD VACCINATION



Control methods used in Israel during past outbreaks

Year	Region	# of epi units	Vaccine used	Stamping out
1989	South	1 village	SPPV around	total
2006	South	1 village	SPPV After incursion	clinical cases
2007	South	8 villages	SPPV Before outbreak	Clinical cases
2012-2013	North	293 herds	SPPV-1 SPPV-10 Neethling	few Salvage

Israel 1992

KSGP 0240 vaccine adverse reaction in dairy cows near GS

Age group	Number		% reactive
	vaccinated	reactive	
>3 years	3,638	360	9.89
Primiparae	1,536	222	14.4
Pregnant heifers	1,134	11	0.97
Female calves	2,959	12	0.40
Male calves	518	2	0.30
total	9,785	607	6.2

Yeruham I et al. Adverse reactions in cattle to a capripox vaccine. *Vet. Rec.* 1994; 135, pp 330-332.

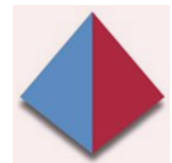
Delegate from Pirbright

An expert was delegated from Pirbright to visit the farms and discuss the issue. Infected material from Gaza (sampled from the mentioned calf, 18 Nov 1992) and from PV-reactive Israeli cows were submitted to Pirbright. Eventually, the material from Gaza was confirmed there to include a field strain of the LSD virus.

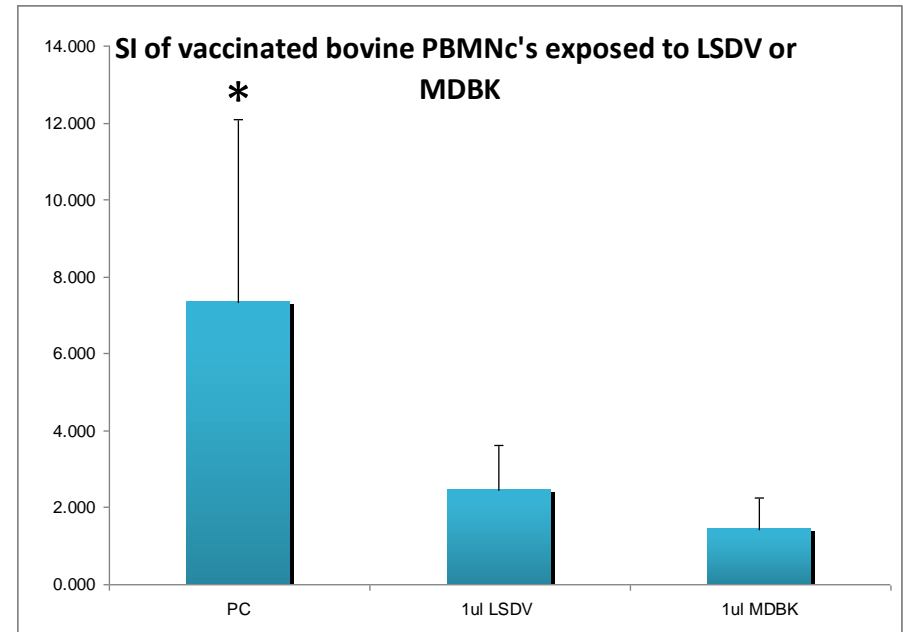
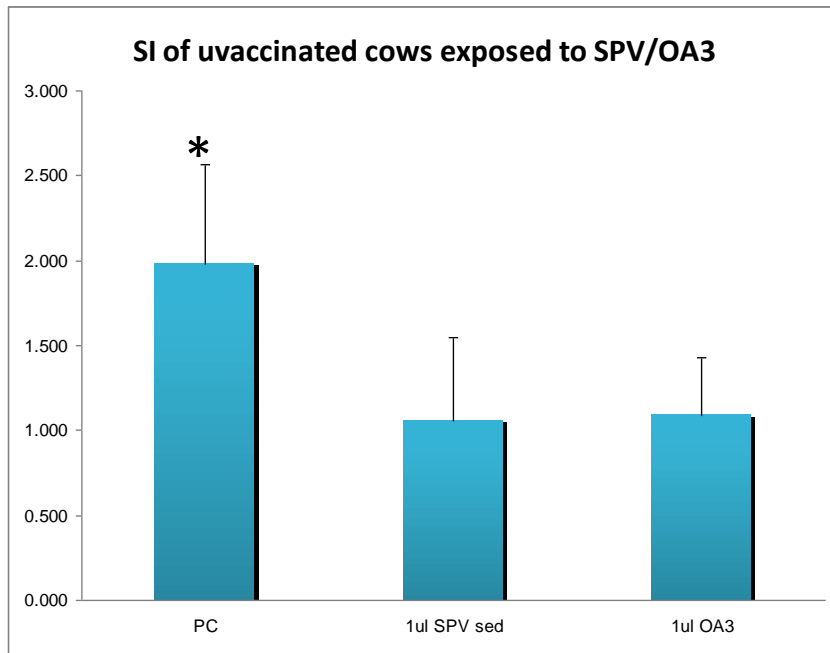
Following the event, Pirbright's user-instructions for the KSGP 0240 vaccine were revised to include a warning "not for the vaccination of Bos Taurus cattle". This falls in line with the findings that the said vaccine strain is, in fact, LSDV (Ref 4).

“not for Bos Taurus”- Breed differences ?

Tulman ER et al. The genomes of sheeppox and goatpox viruses. J Virol. 2002; 76(12): 6054-61.



Cellular immunity to SP-RM65 in cows

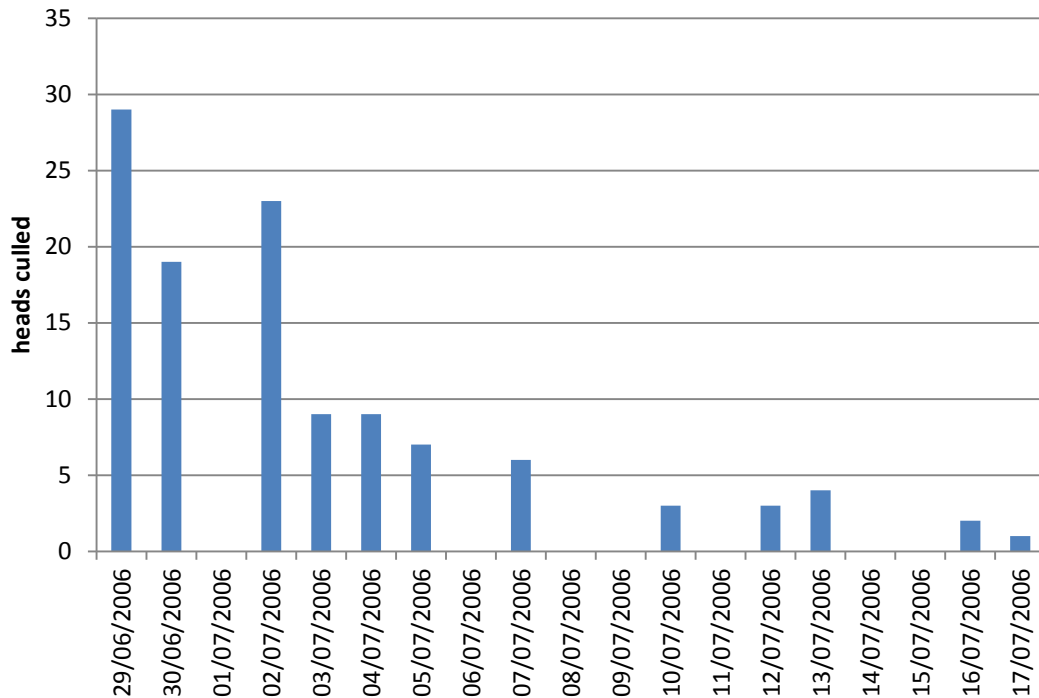


“RM65 did not induce good cellular immunity against LSD.
RM65 does not give good protection against LSD”

Klement 2007, unpublished



2006 EIN-ZURIM dairy farm SPPV



Single farm (~600)

20 km from GS

Many farms near by

Late detection

Vaccinated at detection

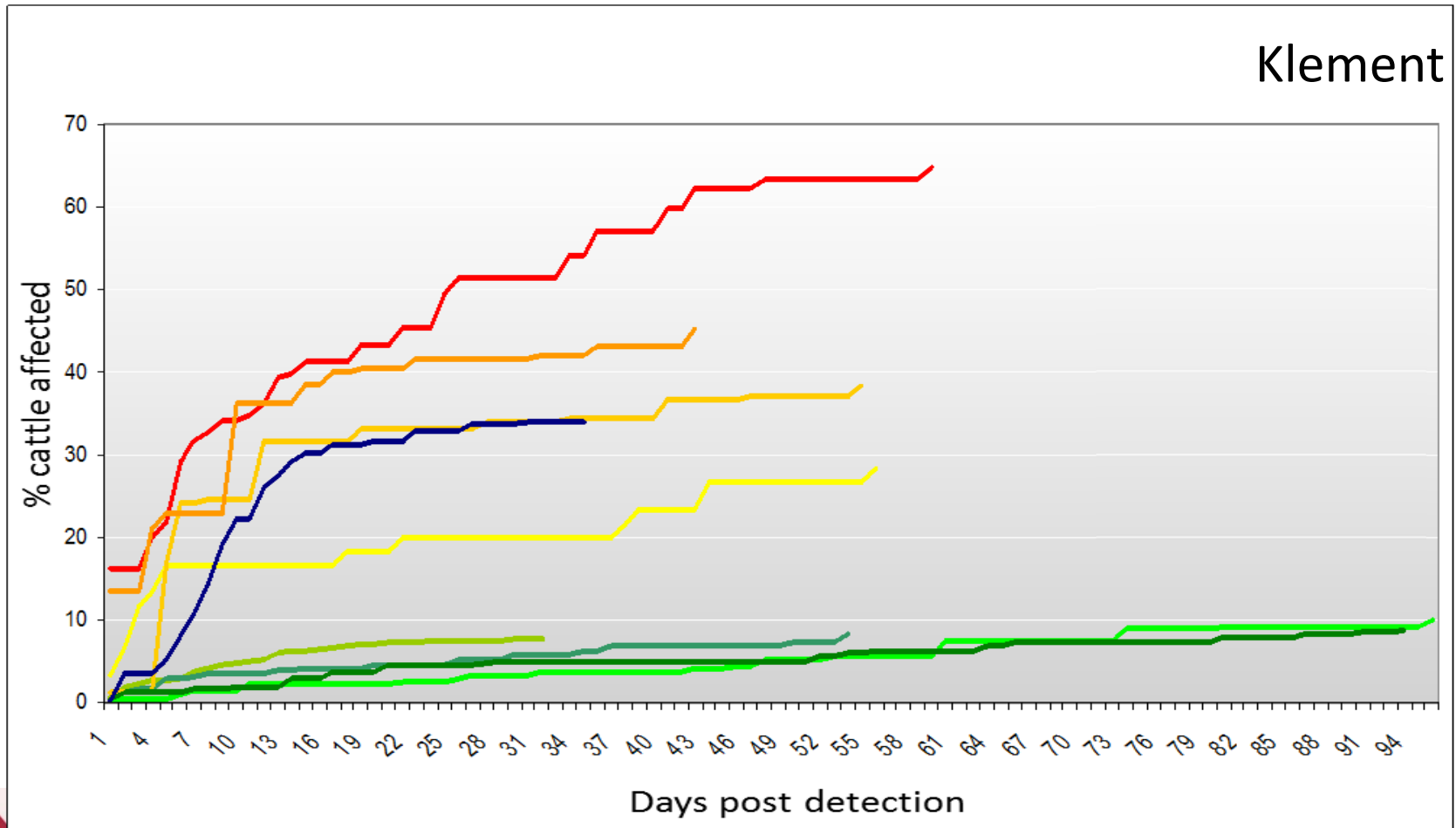
Check & cull

3X / week

33% culled

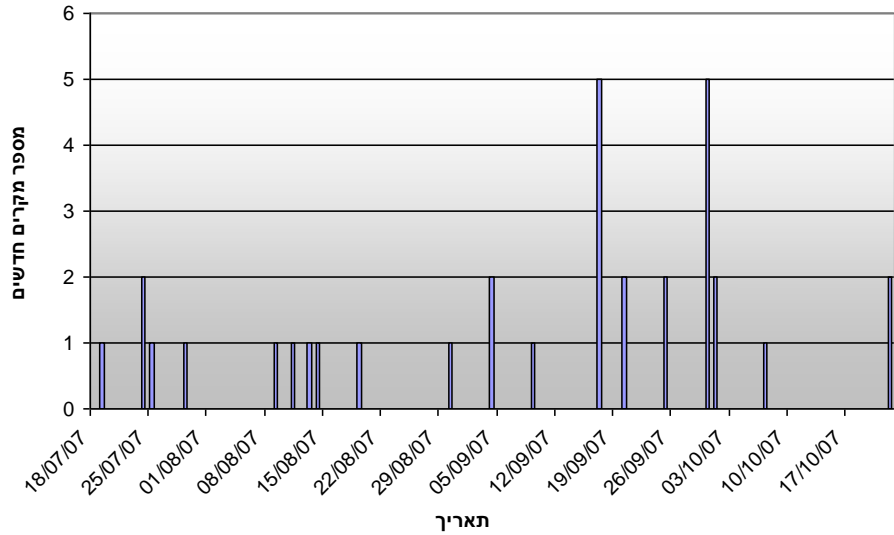
LSD Morbidity in SPPV RM65

8 vaccinated herds near GAZA S. 2007

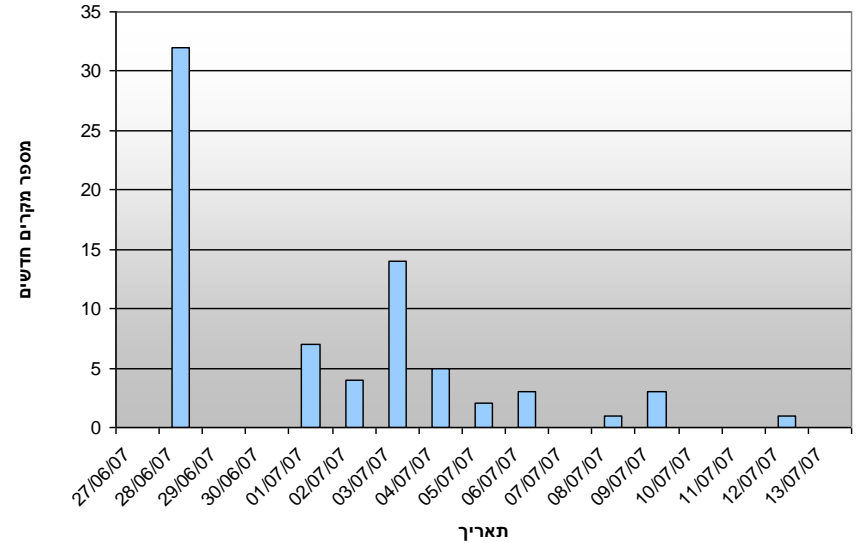


LSD in 8 SPPV- RM65 vaccinated herds 2007 – check & cull

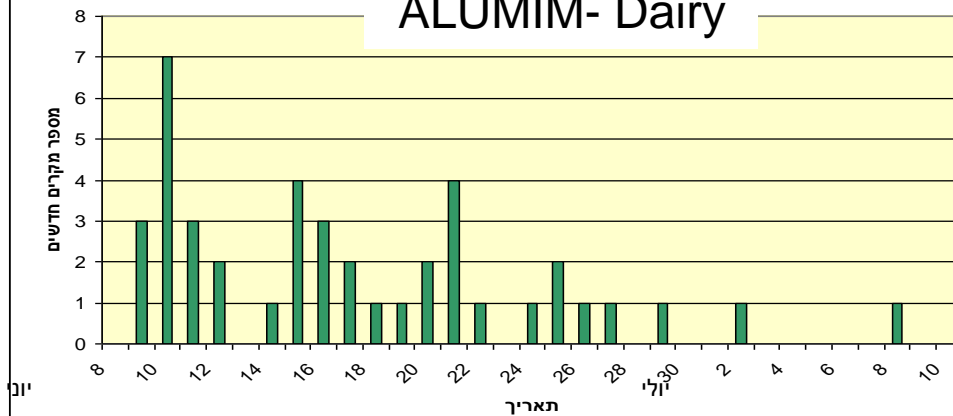
SHIKMIM- Beef



OR HANER - Beef

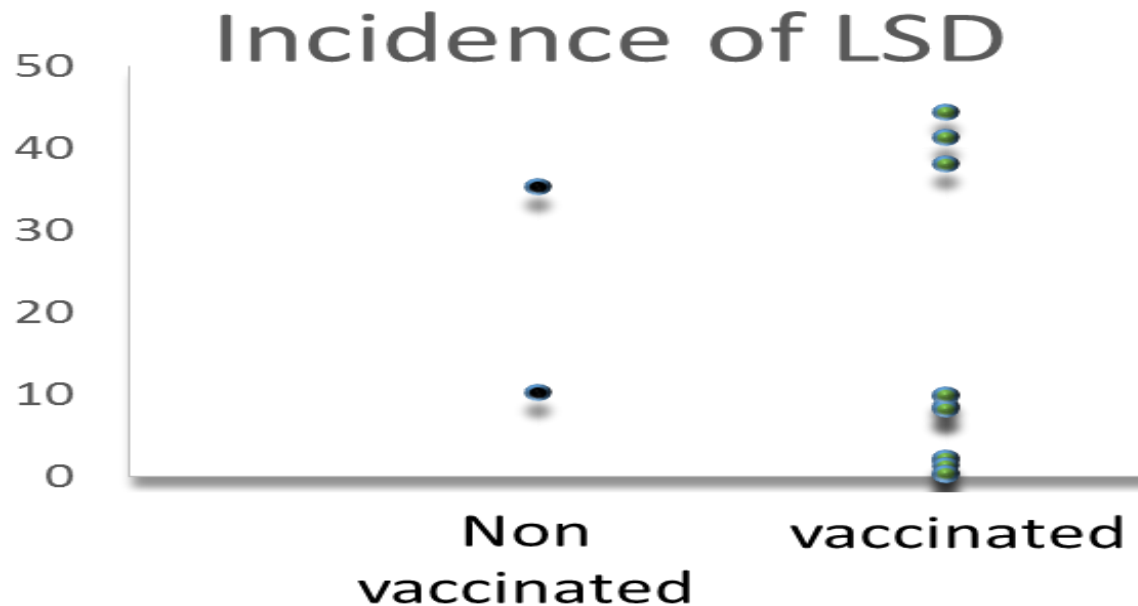


ALUMIM- Dairy



morbidity in vaccinated herds

1989-2006-2007 J. Brenner (KVI)



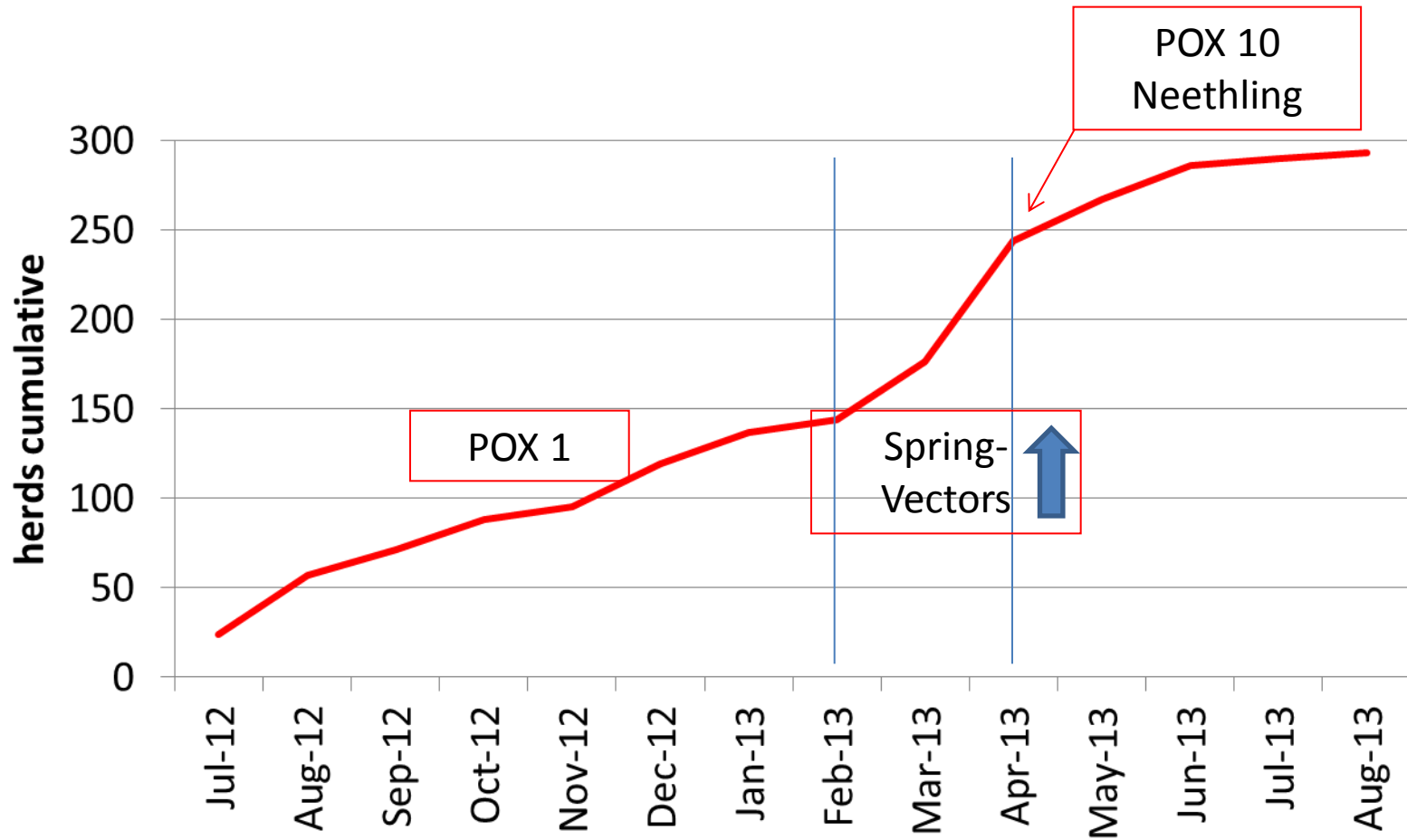
Brenner *et al* Vaccine 2009

- The Romanian strain was used in Egypt during 1989 epidemic – No clear data on efficacy
- 2007- significant morbidity was observed in vaccinated herds.
- RM-65 vaccine (sheep dosage) was used in Israel in 2006 and 2007. ~ 50% effectiveness
- The outbreak ended and the disease disappeared



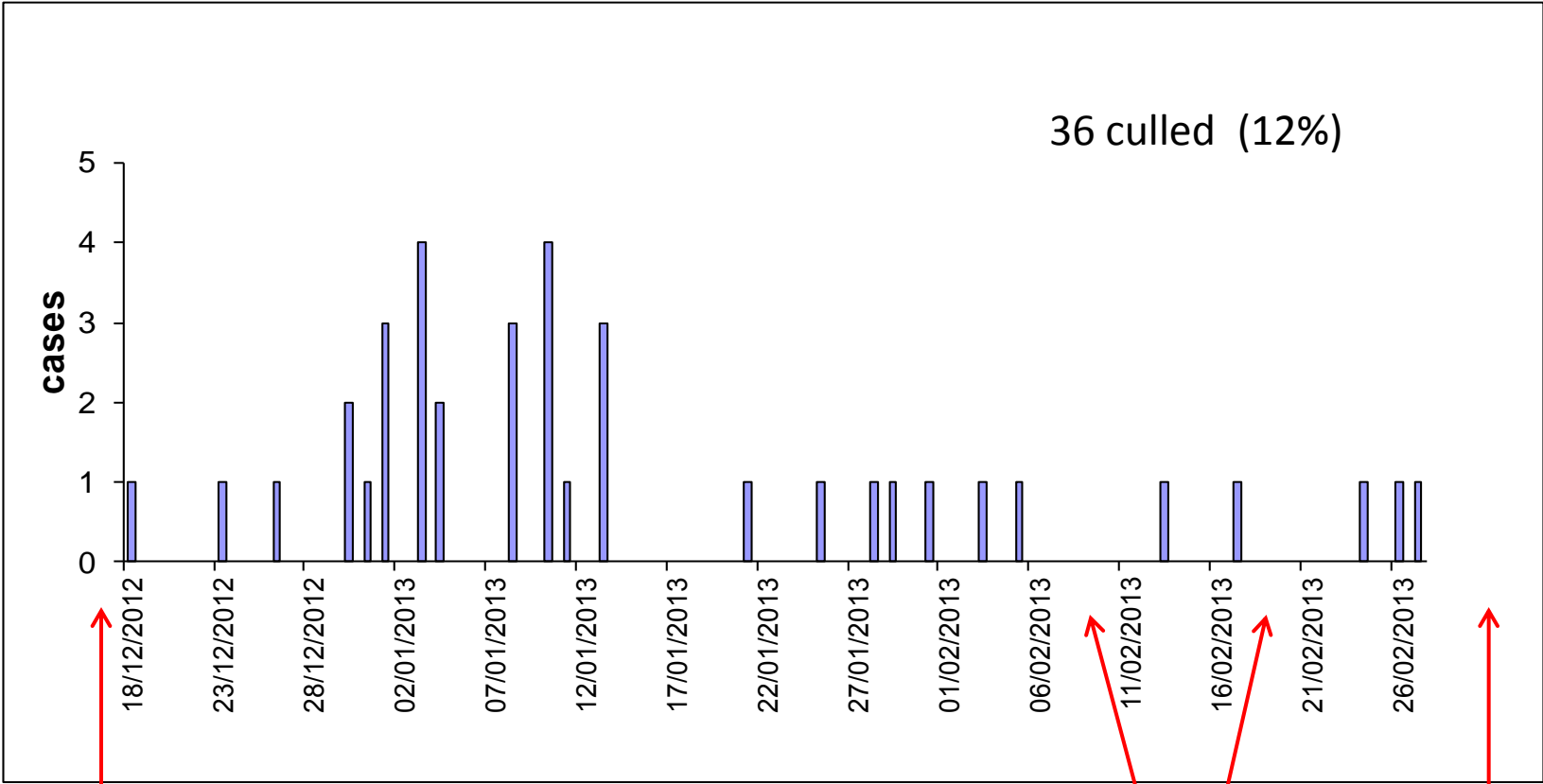
2012-2013 LSD

Cumulative # of infected Herds



Kibbutz GENOSAR – dairy farm 2012

Sea of Galilee, mild winter, 300 milking cows



Pox 1
04/12/12

Pox 10
08-18/02/13

Neethling
18/03/13 ~

COMPARISON OF THE EFFICACY OF NEETHLING LUMPY SKIN DISEASE VIRUS AND X10RM65 SHEEP-POX LIVE ATTENUATED VACCINES FOR THE PREVENTION OF LUMPY SKIN DISEASE – THE RESULTS OF A RANDOMIZED CONTROLLED FIELD STUDY

[BEN-GERA J](#) ET AL. [VACCINE](#). 2015 SEP 11;33(38):4837-42. DOI: 10.1016/J.VACCINE.2015.07.071. EPUB 2015 AUG 1.

Vet school
Vet services
Private vets
farmers



For animal use only

LUMPY SKIN DISEASE
VACCINE FOR CATTLE

Reg. No. G 0110 (Act 36/1947) Namibia: NSR 0584

VS



JOVIVAC®

Freeze dried live attenuated Sheep Pox
Virus strain RM-65 Vaccine.

controlled randomized field trial

Natural trial- Comparative efficiency

Neethling vs Pox-10 (10^4 2ml)

- After lab tests and field Safety trial
- March – July 2013
- 15 dairy herds >250 milking cows
- Unaffected herds near-by outbreak zone
- Each farm: $\frac{1}{2}$ Neethling $\frac{1}{2}$ Pox-10
- Clinical monitoring - VS and Vet School
- 8 farms infected

Neethling vs. Pox-10 controlled field trial results

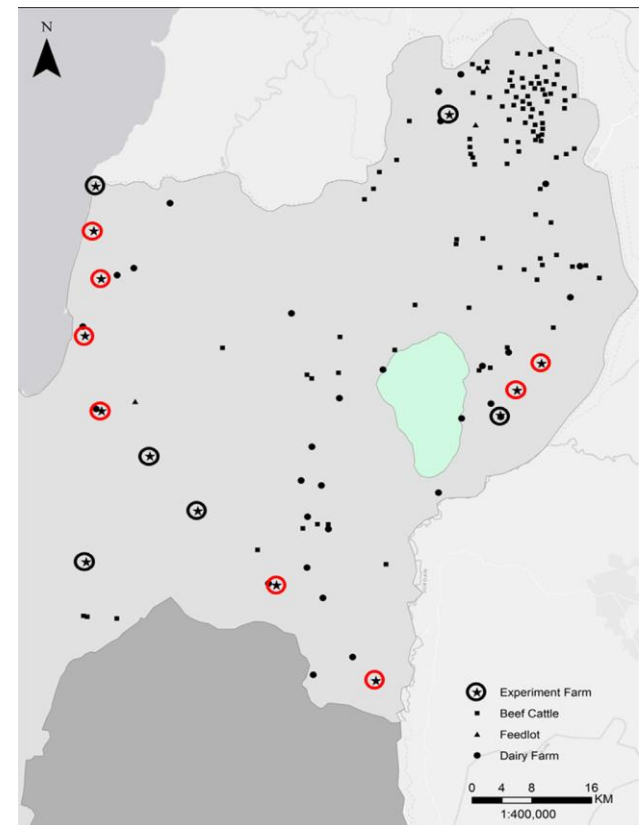
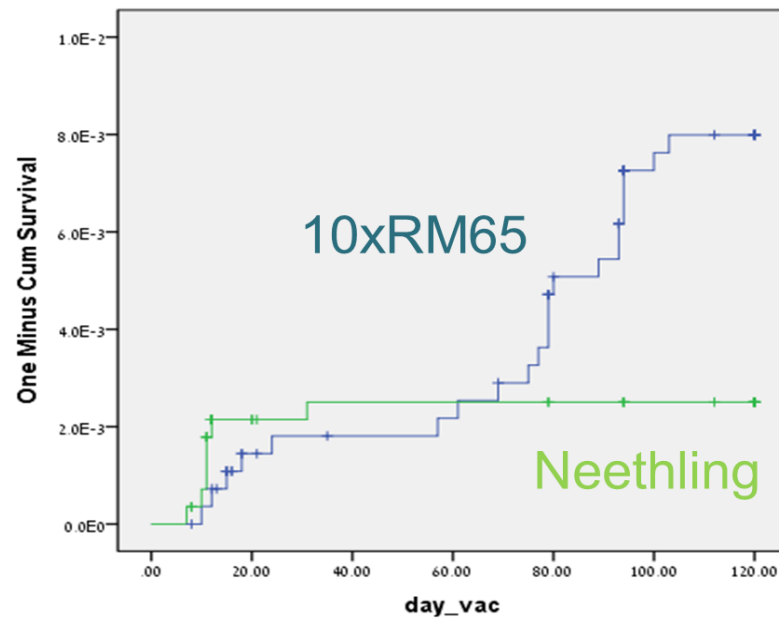
	Neethling OBP	Pox-10 Jovac
# vaccinated	4,222	4,279
# Non clinical	4,192	4,178
% non clinical	99.3%	98.8%
% Clinical cases	30 (0.7%)	51 (1.2%)
mild	7	22
severe	23	29

J. Ben Gera et al Vaccine (33) 2015

Results

significantly higher morbidity in the 10XRM65 group

Severe cases



Ben-Gera et al. [Vaccine](#). 2015



Neethling vaccine adverse reactions

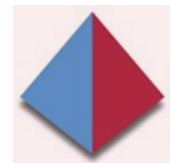
- 9 confirmed cases in vaccinated cows (incidence= 0.4%).
1 severe case
- All within 14 days post vaccination
- No Isolation of Neethling strain from a non-Neethling vaccinated cow



Country LSD vaccine comparison

Countries	Vaccine used	LSD cases	Vaccination- last case
Israel	Neethling (Pox 10)	none	5 months
Bulgaria	Neethling	none	4 months
Serbia	Neethling	none	Several months
Balkan	Neethling	some	
Greece	Neethling	some	
Turkey	SPPV (Pox 3)	some	
Russia	SPPV	some	

Other countries: middle-east, Africa, Eurasia - unclear



LSD Vaccines History (Evolution)

“from LARNACA 2013 to ISTANBUL 2016”

- **B.N** - Before Neethling
 - Southern Africa
 - Limited EBM
 - Field experience, sales

- **A.N**- After Neethling
 - EBM- efficiency, safety
 - Field experience

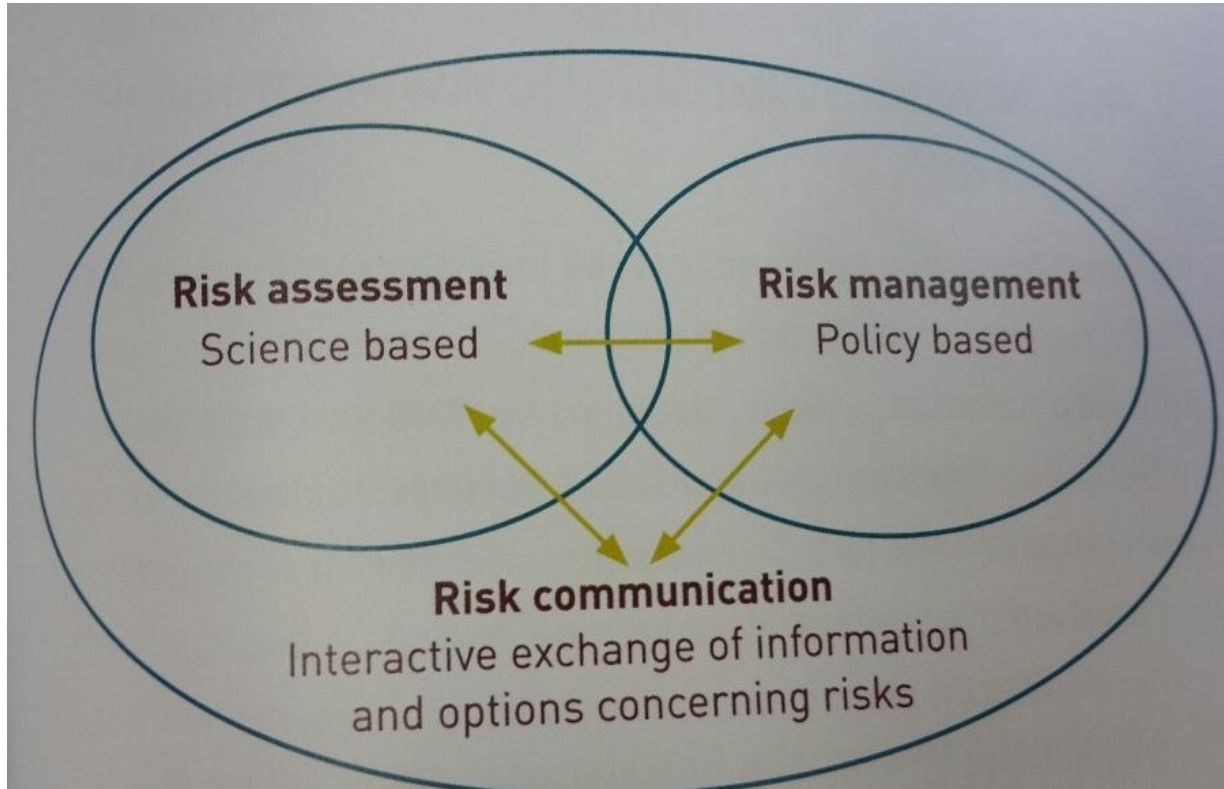


Conclusions

- To date most EBM favor Neethling vaccine
- Neethling is about 80% effective
- Full protection is achieved 30 days post vaccination
- Models and field data show that LSD outbreaks can be fully controlled with good coverage.
- Transient adverse effects 0.5% of cows = negligible
- Drawbacks- vaccine contaminants, non- GMP
- Price? Availability ?



*“The facts of today
are the fallacies of tomorrow”*



thank you

Live bovine movements 2008-2014

Countries reporting LSD in 2011-2014 according to OIE

