



Food and Agriculture  
Organization of the  
United Nations



European  
Commission



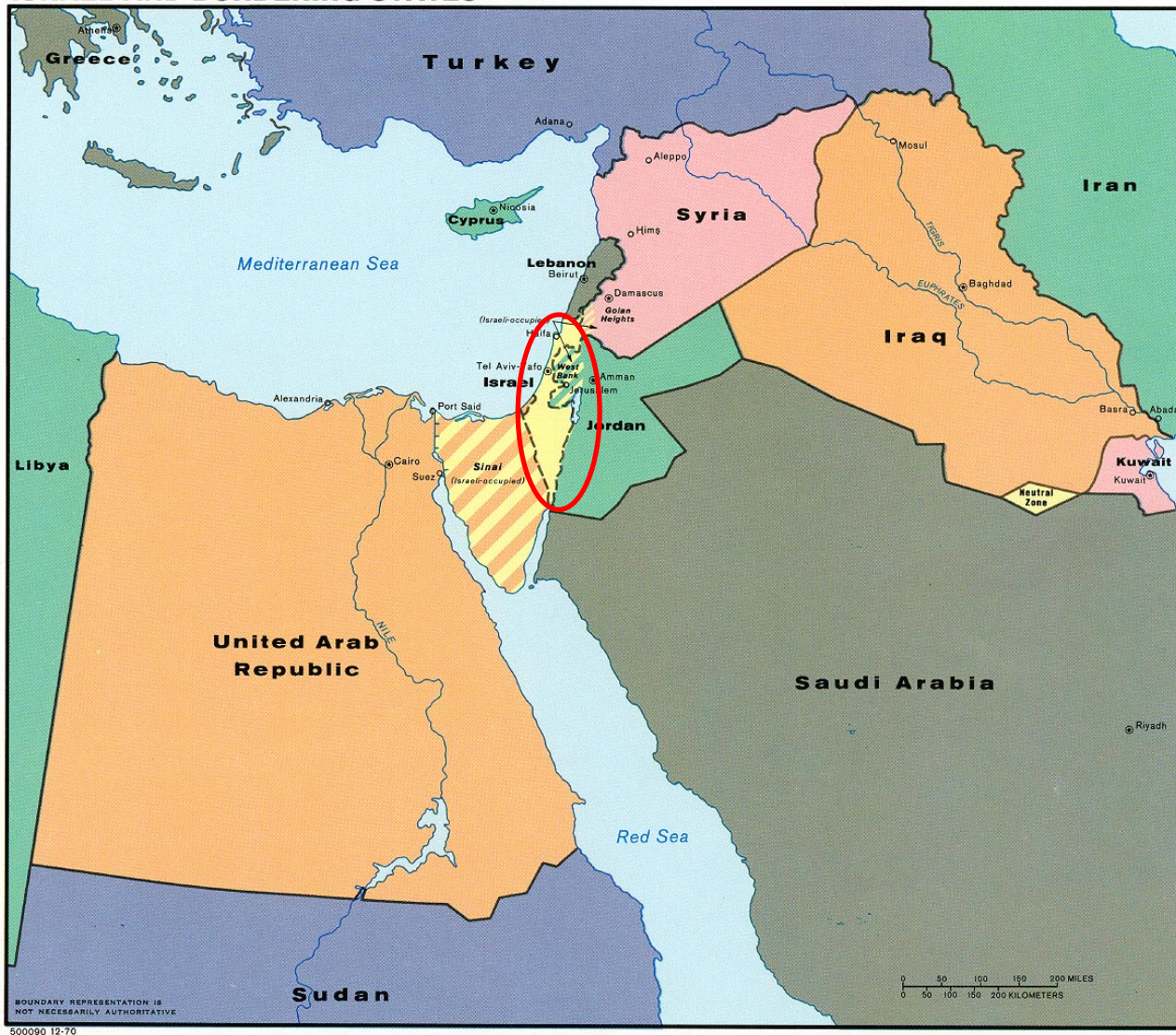
42<sup>nd</sup> General Session of the EuFMD

# Foot & Mouth Disease in Israel 2017

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## ISRAEL AND BORDERING STATES



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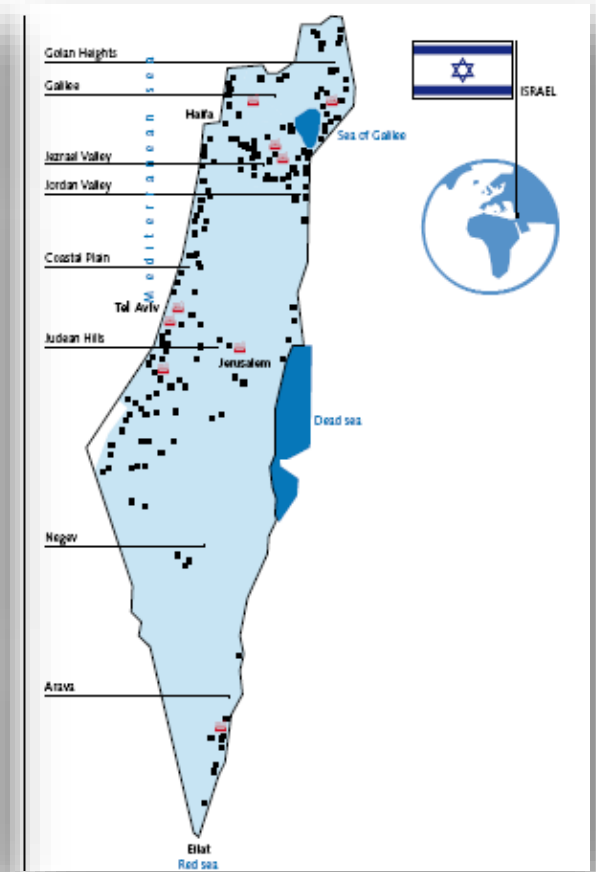
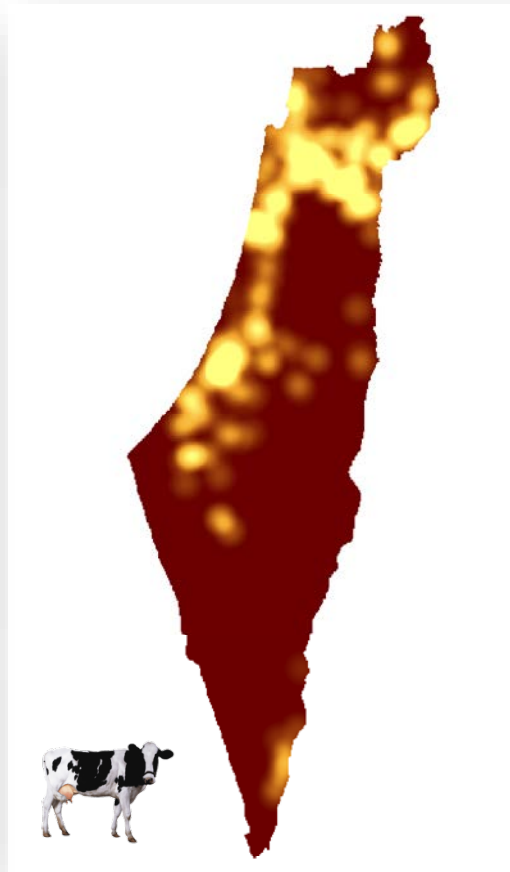
## Susceptible Livestock Population

- Dairy Cattle – 200,000 (cows + replacement)
- Beef- Pasture – 50,000 (cows)
- Beef – Feedlot – 300,000 (steers)
- Sheep – 500,000 (ewes)
- Goats – 100,000 (does)
- Pigs - 20,000 (sows)



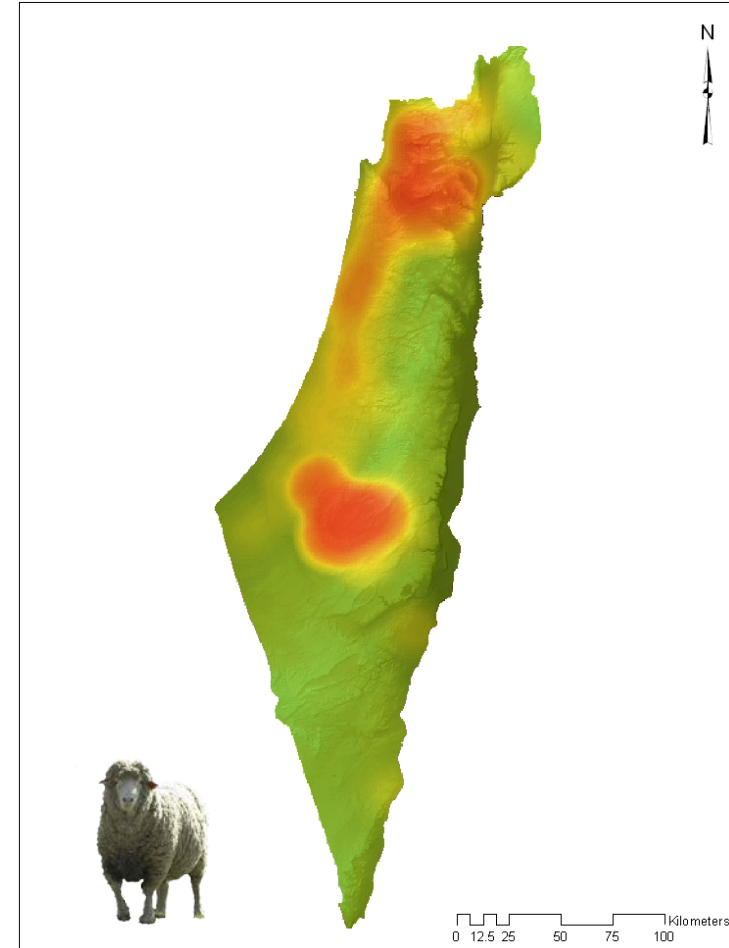
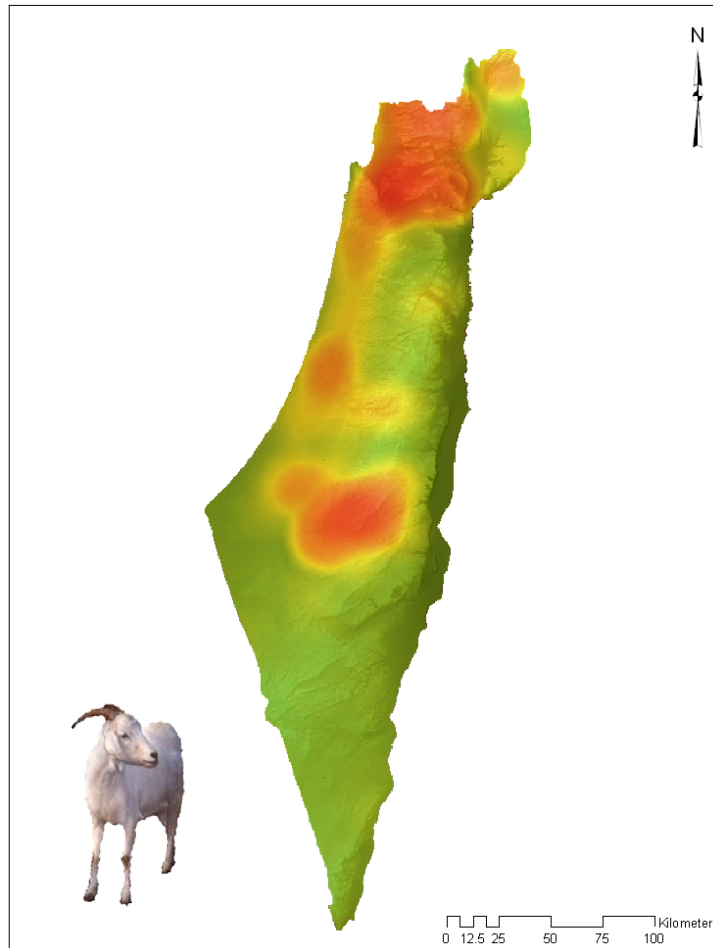


# Livestock densities





# Livestock densities





# FMD Control

- Vaccine strains (Pool 3):
  - Type **O** contains antigens: Manisa, Geshur 85 (O4625 ), O-3039, O Panasia 2.
  - Type **A** contains antigens: A- 4165 + A Iran 2005.
  - Type **Asia1** contains antigen: Asia 1 Shamir. (cattle only)



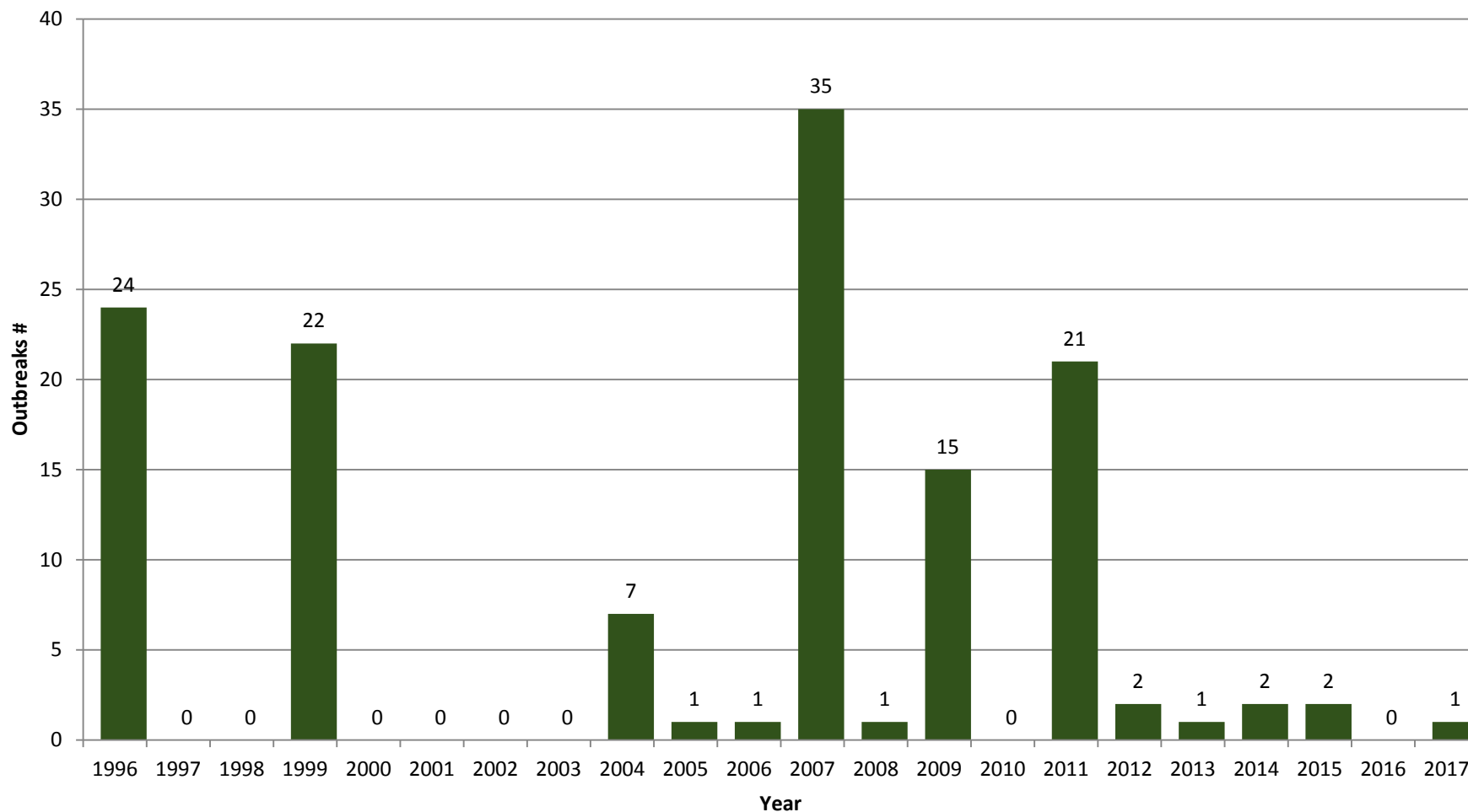
## FMD control 2014-6

Animal	annual vaccination (average)
Cattle	707,158
Sheep & Goats	953,415

- Over all ~ 98.5% of registered herd were vaccinated in 2016.
- FMD vaccination is mandatory and done by the IVS.



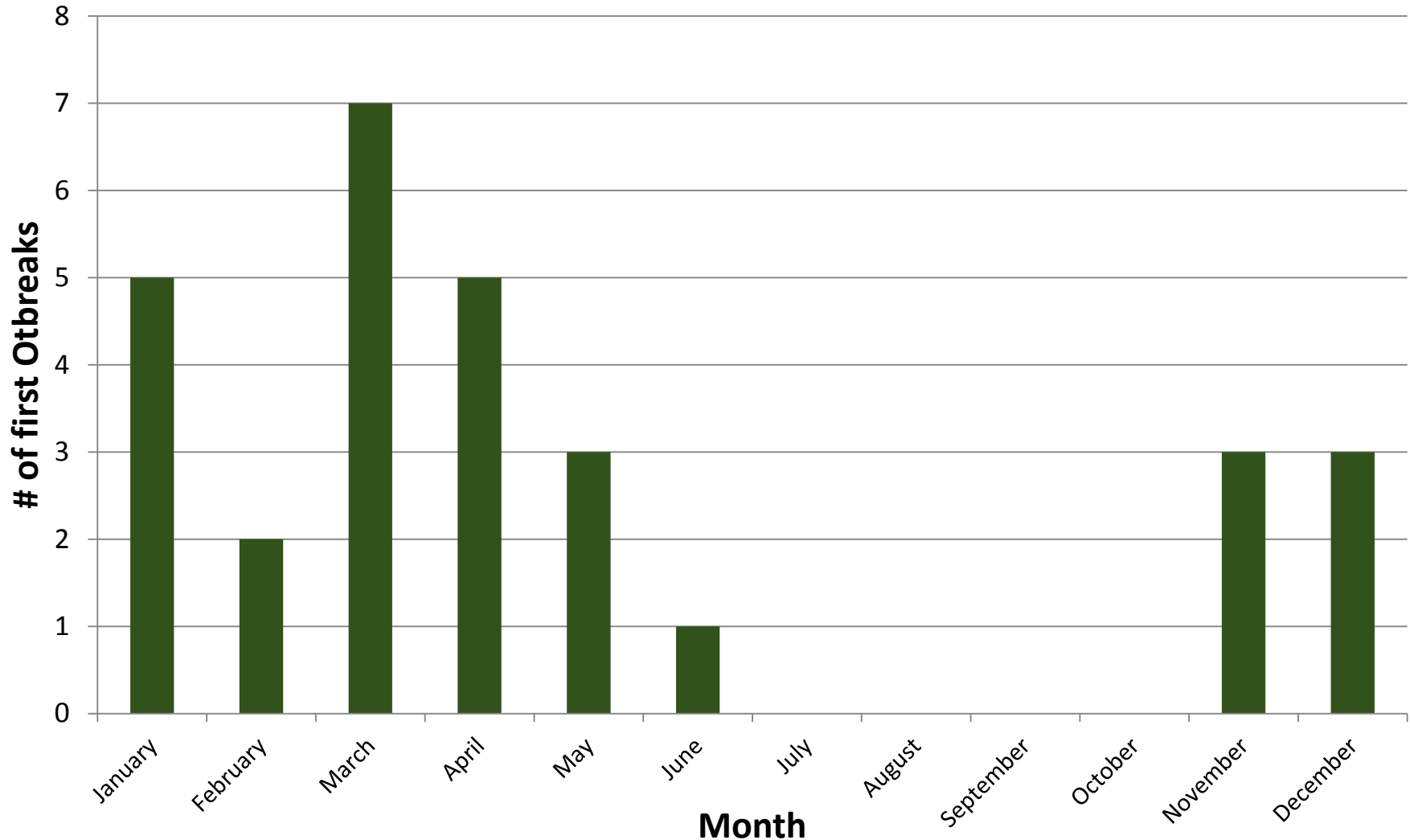
## Outbreaks (1996-17)





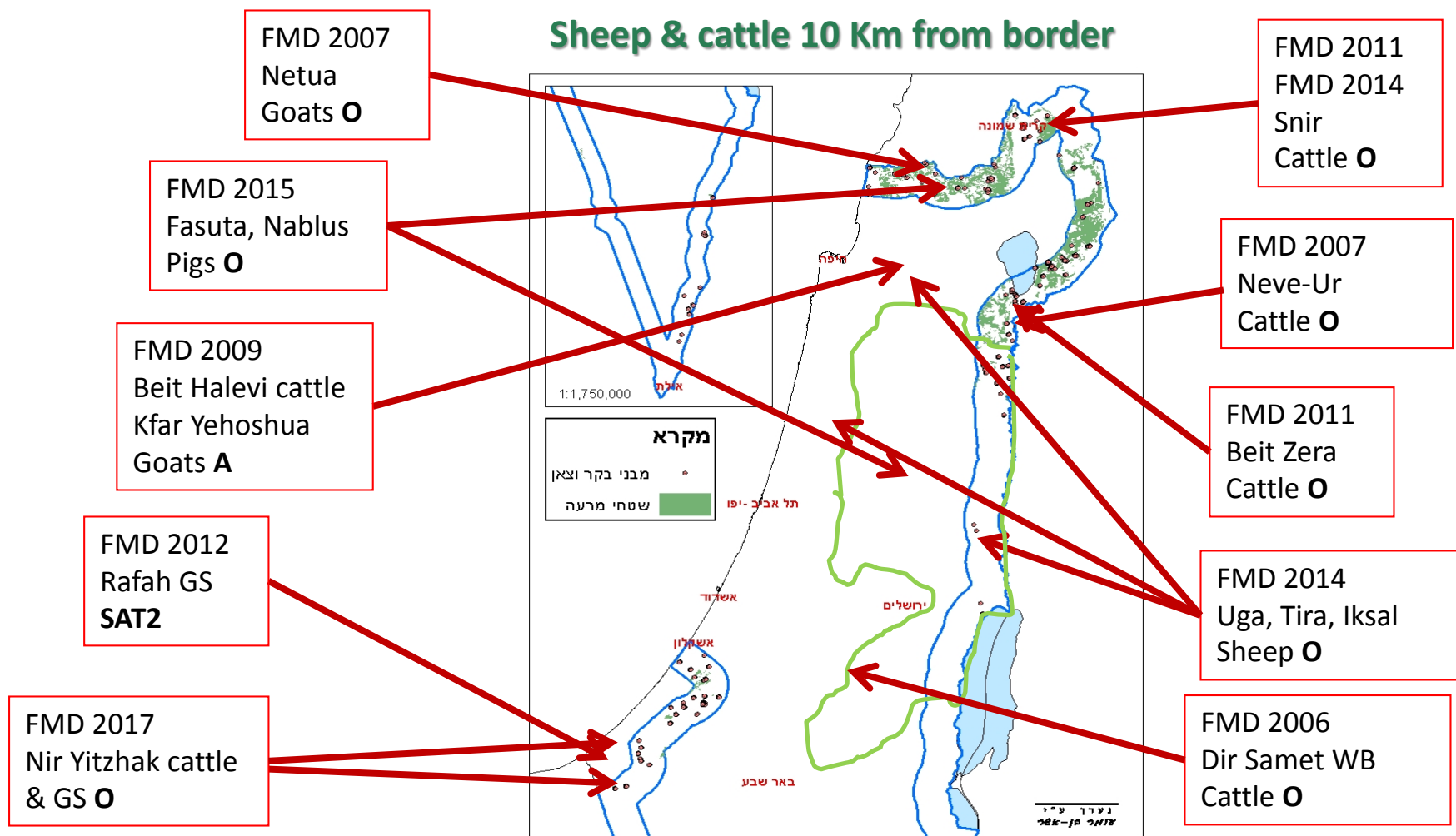


# Outbreak by Index case Month (1974-2017)





# Historical Israeli FMD Outbreaks





## FMD Outbreak in Dairy Farm – Nir Yitzhak

- First major outbreak in a dairy farm in years.
- Israeli farms are vaccinated annually from October, young stock is vaccinated 3-5 m with booster 3 m later.

### Nir Yitzhak:

- 775 cows & heifers.
- The cows were vaccinated 1 year beafore.
- Replacement heifers – at 2-4 m and boosted 3 m later.



## Outbreak area

### Farms in 10 km radius:

Holit – dairy farm.

Nir Oz- Cattle Feedlot.

Magen – Replacement dairy  
heifers .

Nave – sheep farm.

Pri Gan - sheep farm.

Talmei Yosef - sheep farm.

Eshcolot - sheep farm.







# Nir Yitzhak







# Nir Yitzhak Dairy farm





# Nir Yitzhak Dairy farm





## Possible Incursion

- Air born.
- Nearby road (232).
- IDF border patrols.
- Other – wild animals; animal traders ect.



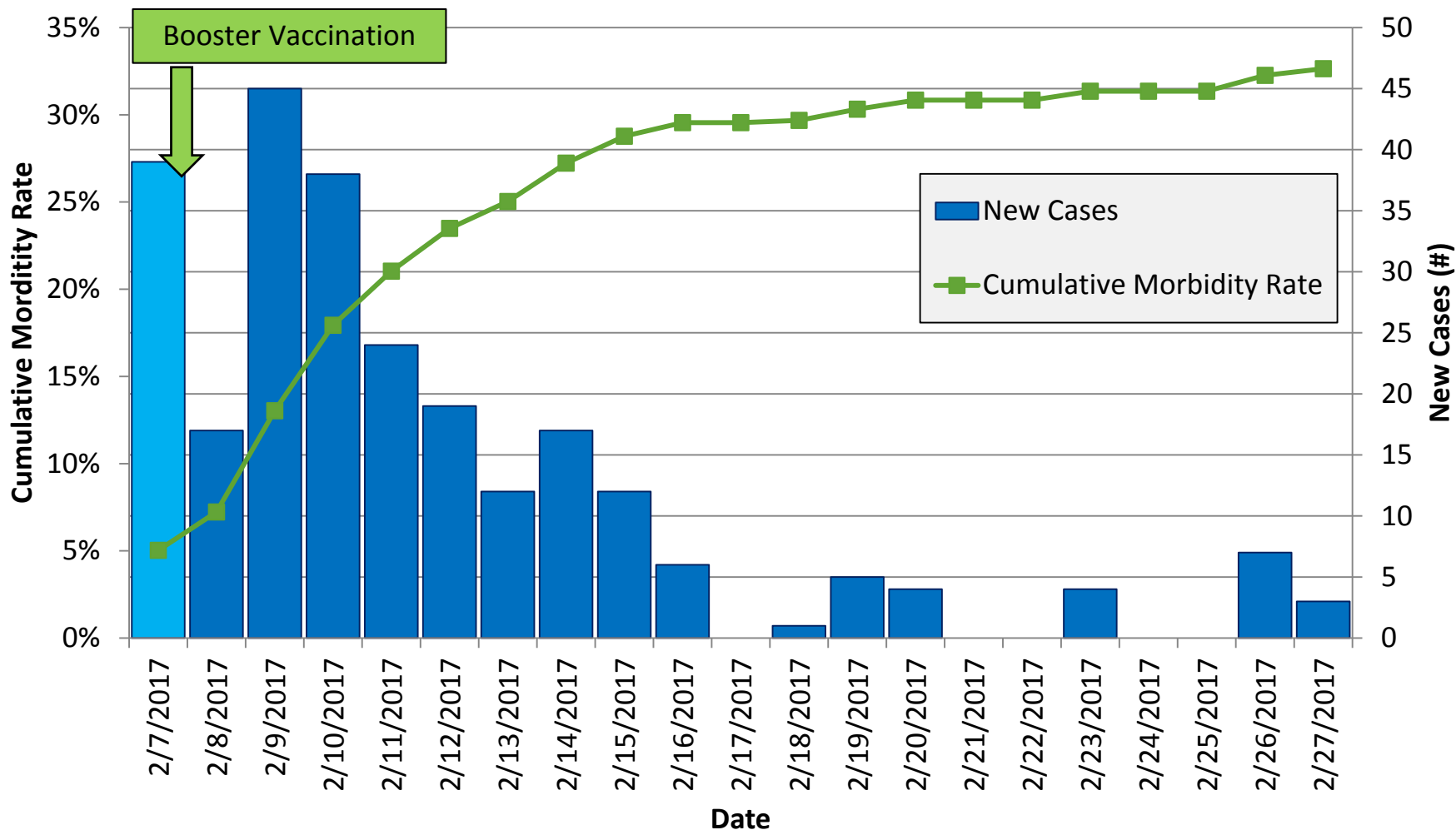
## Morbidity by group

Group	Age	# animals	# cases	Morbidity Rate
Hutches	0 – 2 m	41	4	9.8%
weaning	2 – 4 m	40	20	50%
Replacement	4 – 18 m	80	6	7.5%
Pregnant Heifers	18 m +	103	41	39.8%
1 <sup>st</sup> Calf Heifers	2 years +	96	59	61.5%
2 <sup>nd</sup> Lactation	3 years +	93	31	33.3%
3 <sup>rd</sup> + lactation (B)	4 years +	90	34	37.8%
3 <sup>rd</sup> + lactation (C)	4 years +	103	28	27.2%
Low producers (D)	mixed	44	18	40.9%
Dry cows	3 years +	45	1	2.2%
Close up	3 years +	40	11	27.5%
<b>Overall</b>		<b>775</b>	<b>253</b>	<b>32.6%</b>





# Epidemiological Curve







## Mortality

- 8 cows & 1 pregnant heifer.
- Deaths due to secondary infections, mainly mastitis and septic arthritis.
- No mortality in young calves or heifers.





## Indirect losses

- Milk production loss.
- Inability to sell cows and bull calves.
- Crowding.
- Diseased cows that healed and did not return to milk (w/o secondary infections; ~ 10 cows)

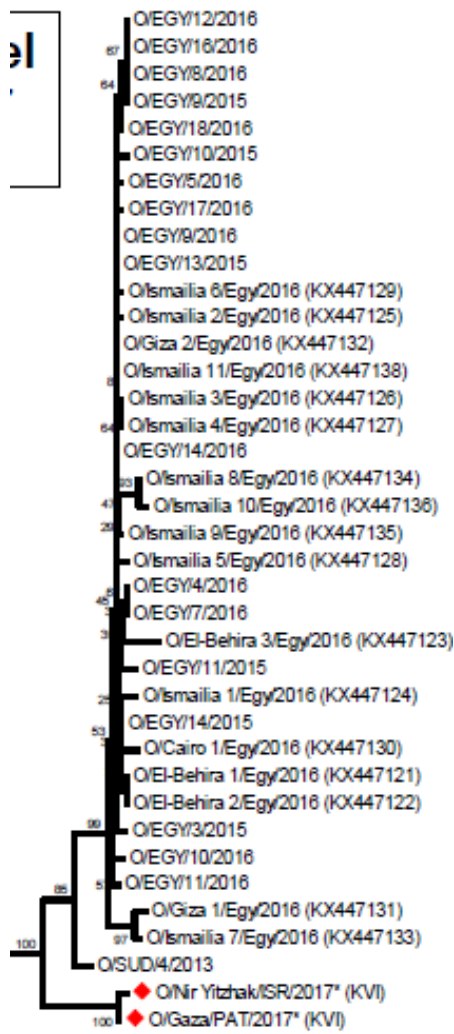


## KVI Virus typing

Outbreak Location	ELISA	RT-PCR	Vp1 Sequencing	Vaccine matching
Nir Yitzhak	Serotype O	Serotype O	Serotype O O/EA -3 Topotype ~90% identity to recent isolates in Egypt and Sudan	Unavailable
Gaza Strip	Serotype O	Serotype O	Serotype O O/EA -3 Topotype ~90% identity to recent isolates in Egypt and Sudan	Unavailable



# Pirbright genotyping





# Pirbright genotyping

Most Closely Related Viruses									
Pos.	Virus name	Filename	No. nt comp.	No. nt match.	No. of ambig.	% Id.	% Diff.	Topotype	Strain
1	O/Gaza/PAT/2017* (KVI)	PAT17-AA	538	537	0	99.81	0.19	EA-3	unnamed
2	O/SUD/4/2013	SUD13-04	564	546	0	96.81	3.19	EA-3	unnamed
3	O/EGY/10/2016	EGY16-10	564	538	0	95.39	4.61	EA-3	unnamed
4	O/EGY/13/2015	EGY15-13	564	538	0	95.39	4.61	EA-3	unnamed
5	O/EGY/14/2016	EGY16-14	564	538	0	95.39	4.61	EA-3	unnamed
6	O/EGY/9/2016	EGY16-09	564	538	0	95.39	4.61	EA-3	unnamed
7	O/Giza 2/Egy/2016 (KX447132)	EGY16-AL	564	538	0	95.39	4.61	EA-3	unnamed
8	O/Ismailia 11/Egy/2016 (KX447138)	EGY16-AR	564	538	0	95.39	4.61	EA-3	unnamed
9	O/EGY/11/2016	EGY16-11	564	537	0	95.21	4.79	EA-3	unnamed
10	O/EGY/14/2015	EGY15-14	564	537	0	95.21	4.79	EA-3	unnamed





## Conclusions

- Prioritization of Vaccination order (October-November):
  - 10 Km from border.
  - 10 km from exporting dairy factories.
- Exportation of cattle vaccinated twice to the GS.
- Vaccine efficacy - poor matching but efficient vaccinator?



## Collaboration with the PA

- Periodical meetings and coordination.
- Information exchange.
- Diagnosis in the KVI.
- FAO visits and workshops.



## Future challenges

- Continued collaboration with the PA in the current format:
  - Joined workshops.
  - Active surveillance.
- Local, regional importance.
- Importance to the EU.



# Thanks

## Acknowledgment

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