



Foot and Mouth Disease Vaccination, and Identification of Yaks and Cattle in Wakhan District, Badakhshan Province, Afghanistan September - October 2013



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Cover Photograph

Mr. Sarwar, WCS paravet, vaccinates a domestic yak against foot and mouth disease with the help of two local shepherds, Little Pamir, Wakhan District.

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Summary — Between September 14th and October 6th, 2013, WCS veterinarians supervised the vaccination against foot and mouth disease (FMD) of 1,996 yaks and 358 cattle in Wakhan District, Badakhshan Province, Afghanistan. Two local paraveterinarians trained by WCS, implemented the mass vaccination campaign. For the first time ever all vaccinated yaks were also identified with numbered metal ear-tags. We estimated that in 2013 more than 85% of the yak population in western Pamirs was identified. The participation of local communities in yak vaccination and identification, and their level of appreciation were deemed optimal.

General introduction

Foot and mouth disease (FMD) is an extremely contagious viral (family Picornaviridae) disease for cloven-hoofed domestic and wild animals. It is endemic in most of Asia (including in the Middle East and Central Asia), Africa, and South America. There are seven immunologically distinct serotypes and over 60 subtypes of the FMD virus (FMDV). The disease is endemic in Afghanistan where it occurs as regular epizootics. It has a direct effect on food security as it drastically reduces milk production in cows, reduces their fertility rate and incapacitates breeding bulls and oxen. A new serotype (Asia 1) was identified in Afghanistan in March 2001 (S. Yingst / CVL-Kabul pers. comm.), bringing the total of known serotypes to three for the country (A, O and Asia 1). The virus is very stable at low temperatures and can

survive in frozen tissues. It may persist for days to weeks in organic matter under moist and cool temperatures. It is however inactivated on dry surfaces and by UV radiation (sunlight). Transmission primarily occurs by respiratory aerosols and direct or indirect contact with infected animals. Sheep and goats are occasionally considered maintenance hosts, and sometimes present very mild signs. Cattle are generally the first species to manifest signs of FMD and are therefore considered 'indicators' of this disease. Recovered cattle can be healthy carriers for up to three and a half years after infection and goats and sheep for up to nine months. The epidemiological importance of carriers or persistently infected animals has been debated for long time. A carrier is defined as an animal with an unapparent infection and where the virus can be isolated from the oropharynx beyond 28 days post-infection. However, it is important to note that transmission by permanently infected livestock or wildlife to susceptible individuals has not been proven despite decades of research, with the exception of the African buffalo (*Syncerus caffer*). Therefore vaccination of susceptible livestock, as a method to control the spread of the highly contagious clinical form of the disease, is useful to decrease the risk of FMDV spill-over to susceptible wildlife.

Because of their remoteness, the Pamirs in the Wakhan District of the province of Badakhshan, have rarely been surveyed for infectious diseases in animals. A three day drive from Kabul, often on a rough track just to access the outreaches of this famous mountain range, has rendered health investigations in this region arduous and logistically expensive to carry out. In 2008, we have shown in a punctual serological survey that 51.3% and 75% of the sheep and domestic yaks (*Bos grunniens*), respectively, had antibodies against FMD (Ostrowski et al., 2009). In addition, two yaks tested with virus neutralization test (VNT) had positive antibody titers against Asia 1 Shamir serotype (and not against serotypes A and O) indicating that at least this FMDV type actively circulated in Wakhan/Pamirs in 2008. Apart from this bit of information, little is known about the epidemiological status of the disease in this remote stretch of land bordered in the south by Pakistan, in the east by China and in the north by Tajikistan.

The purposes of the present work were: 1) to supervise the implementation of the vaccination campaign of cattle and yaks against foot and mouth disease in Wakhan district; and 2) achieve for the first time ever, identification of vaccinated yaks with metal-numbered ear tags.

Methods

We purchased 2,750 doses of FMD vaccine¹ from DCA Kabul (same vaccine brand since 2009). We stored vaccine vials at WCS office in Kabul between +1°C and +8°C, according to manufacturer's recommendations. Vaccines were then transported between Kabul and Faizabad (the administrative center of Badakhshan Province) by car, in cool boxes with ice packs, and a day later to Wakhan. Half of the vaccines were stored in a solar-powered refrigerator in the field veterinary unit of Kandkhun² village and the other half was kept in cool boxes for immediate use. Storage temperature was monitored throughout the transportation period by temperature range indicators. We vaccinated only healthy cattle and yak older than three months. We started the autumn vaccination campaign from Big and Small Pamirs and then continued to villages in Wakhan, ending the district work in the western-most village of Qazideh.

¹ A liquid inactivated sorbed foot and mouth disease vaccine (virus grown in BHK-21 cells) against A Iran-05, O PanAsia-2 and Asia 1 types, produced by the Federal Centre for Animal Health, 600901, Yur'evets, Vladimir, Russia.

² For spelling of place names in Wakhan we followed the recommendations of Dr. John Mock, in Appendix III 'Wakhan Place Names', in *Mock J., K. O'Neil, and I. Ali. (2007) Socioeconomic survey & range use survey of Wakhi households using the Afghan Pamir, Wakhan District, Badakhshan Province, Afghanistan. WCS Unpublished report, New York, USA.*

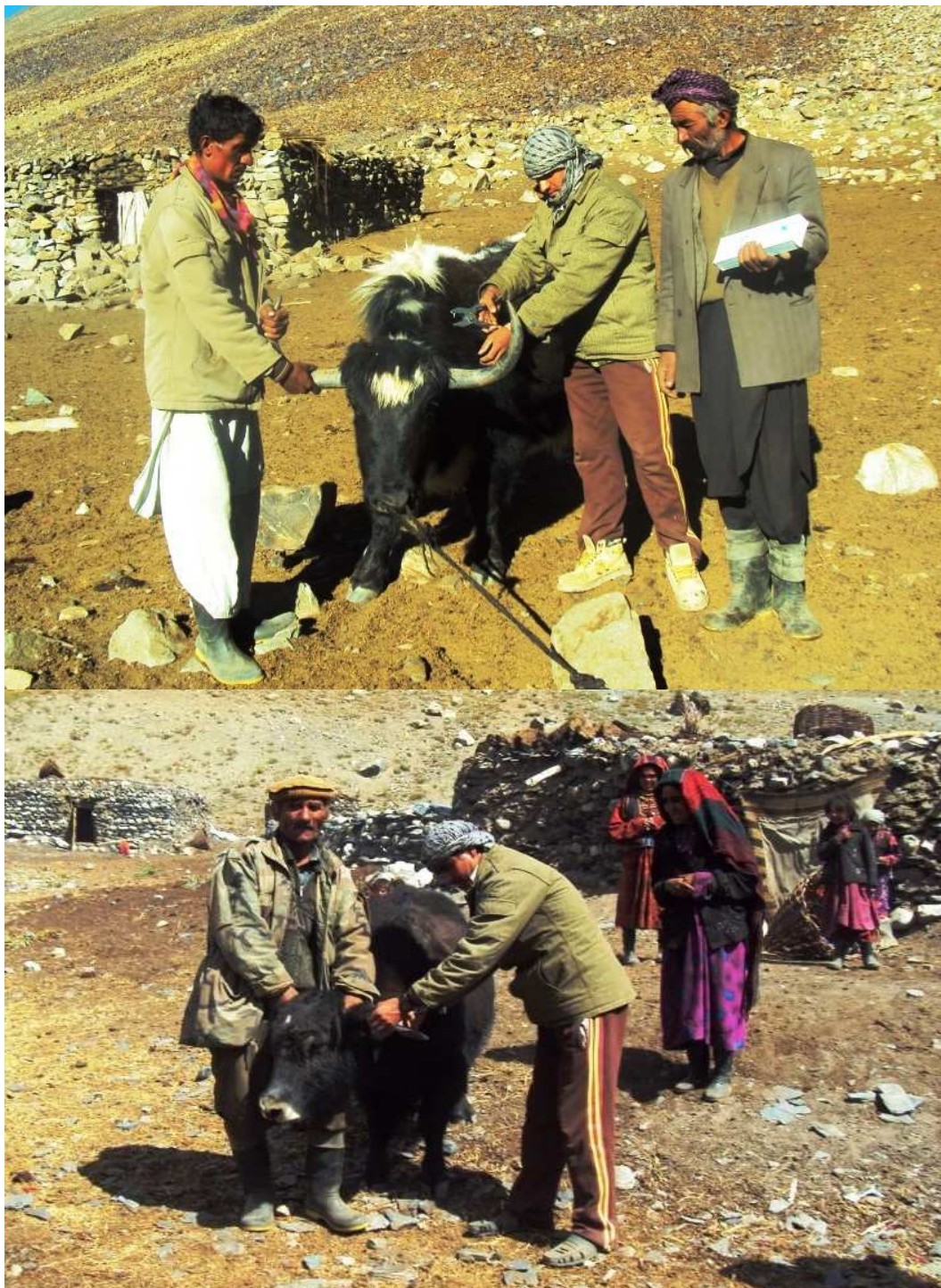


Plate 1 & 2. Mr. Sarwar, one of the WCS's paraveterinarians, vaccinates with a help of local herders, yak and cattle against foot-and-mouth disease and fixes metal ear-tags. The involvement of people from local communities, including women, was crucial for the success of the campaign, Wakhan District, Badakhshan Province, Afghanistan.

On September 10, 2013 the health interface team (HIT) traveled from Qila-e Panja to Sarhad-e Broghil by car and delivered the vaccines to Mr. Mohamad Gull and Mr. Sarwar, the two WCS paravets. Then the team split into two groups. Mr. Sarwar with his helper Mr. Shanbeh vaccinated and tagged yaks in Wakhi settlements of Small Pamir. Mr. Mohamad Gull with Dr. Fahim, one of the veterinarians of the Department of Agriculture in Faizabad, offered vaccinations of cattle between Sarhad-e Broghil and Qila-e Panja at a cost of 10Afs/shot. Despite a preliminary awareness campaign in April 2013, few people agreed to pay for the vaccine and the team relocated to Big Pamir to vaccinate and tag yaks in Wakhi settlements.

Before implementing vaccinations and identifications, team leaders consistently met with the elders (head of shura) of the village to explain the reasons behind the FMD vaccination campaign. The heads of Shuras were instrumental in informing others in the community. Because the campaign involved vaccinating large, untied livestock, collaboration from livestock owners to restrain uncooperative animals was essential. In most villages, animals were gathered by women in individual barns and corrals, and restrained by men.

Each animal older than three months, regardless of age and size, was injected with three ml of vaccine subcutaneously in the middle of the neck. The very few animals younger than three months were not vaccinated because of the likelihood of interference with protective antibodies they passively acquired from their mothers. None of the animals were injured during vaccination operations.

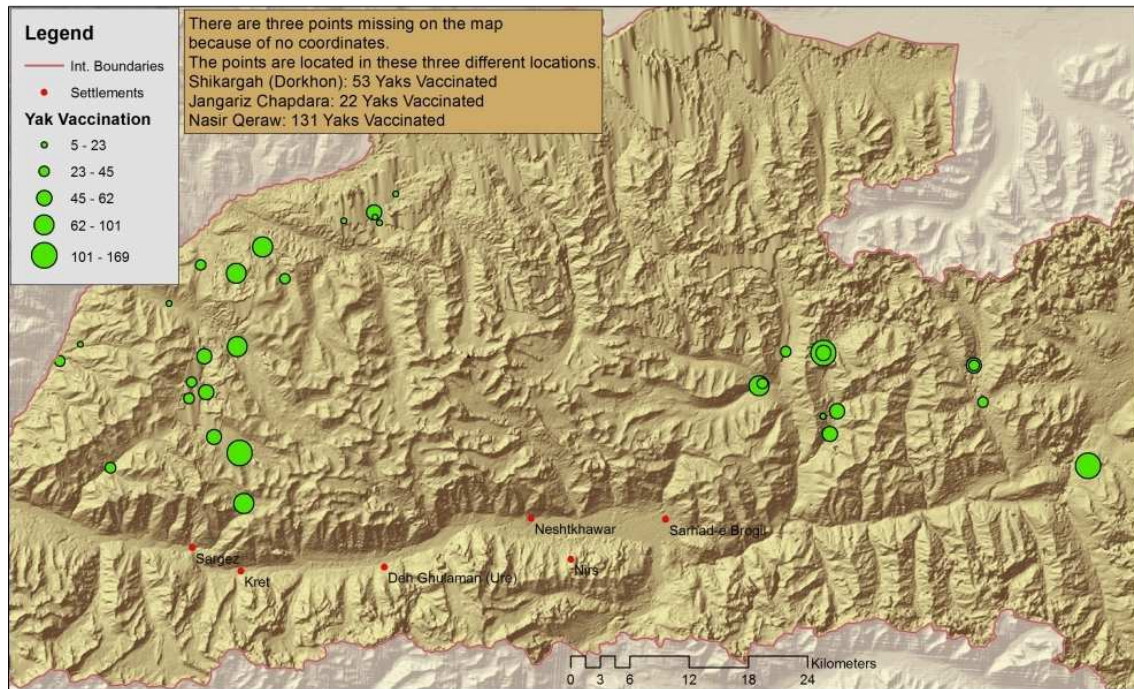


Figure 1: Map of upper Wakhan (Big Pamir and western Small Pamir) showing locations and sizes of yak herds vaccinated against foot and mouth disease by the WCS health interface team in September/October 2013. Three vaccinated herds, in Big Pamir (Shikargah) and Little Pamir (Jangariz Chapdara and Nasir Qeraw), could not be plotted on this map because of inaccurately recorded positions.

Results

Paravets and their helpers vaccinated and tagged 1,996 yaks (Table 1, Fig. 1) in 37 settlements in Big Pamir and Small Pamir and 358 cattle between Sarhad-e Broghil and Qazideh villages (Table 2). Livestock tagging is rarely practiced in Afghanistan, as people fear that it may lead to taxation attempts by the government. We were able to tag all vaccinated yaks because we worked through local paravets and carefully explained the principles and usefulness of this procedure to village leaders. We regard the tagging achievement as a great testimony of the level of community-trust WCS has built in the area. Yak identification is the first step towards better monitoring of this livestock population, recognized as the main source of disease spill-over to wild herbivores in Pamir and Hindu Kush ranges.

Table 1. Location, number, gender and date of FMD vaccination and identification of yaks in Wakhan District, September / October 2013.

	Village/Settlement	Region	Vaccinated yaks	Female	Male	Date
1	Wuzed Valley	Big Pamir	37	22	15	19-09-2013
2	Spanderboq	Big Pamir	45	26	19	20-09-2013
3	Kund-a-Thur	Big Pamir	59	43	16	22-09-2013
4	Nowabad Khushabad	Big Pamir	58	32	26	22-09-2013
5	Asan Katich	Big Pamir	133	77	56	21-09-2013
6	Sargez Valley	Big Pamir	71	40	31	20-09-2013
7	Ganj Khatun	Big Pamir	31	16	15	23-09-2013
8	Mulung Than	Big Pamir	34	15	19	22-09-2013
9	Qabal Gah	Big Pamir	49	22	27	22-09-2013
10	Darah Big	Big Pamir	85	46	39	23-09-2013
11	Nakchirshitk	Big Pamir	80	37	43	23-09-2013
12	Manjulak (Pikhalgar)	Big Pamir	32	22	10	24-09-2013
13	Manjulak (Qaraqash)	Big Pamir	73	36	37	24-09-2013
14	Jabar Khan	Big Pamir	23	10	13	26-09-2013
15	Bulok	Big Pamir	13	6	7	26-09-2013
16	Lupghil Kshun	Big Pamir	19	11	8	27-09-2013
17	Sarghil	Big Pamir	61	40	21	27-09-2013
18	Buqbun	Big Pamir	14	9	5	27-09-2013
19	Shikargah	Big Pamir	11	6	5	29-09-2013
20	Senin	Big Pamir	38	27	11	30-09-2013
21	Pursang	Big Pamir	5	5	0	01-10-2013
	Subtotal		971	548	423	
	Village/ Settlement	Region	Vaccinated yaks	Female	Male	Date
22	Jangariz Chapdara	Small Pamir	22	14	8	14-09-2013
23	Fa Big	Small Pamir	100	73	27	15-09-2013
24	Ruun Zherav	Small Pamir	43	22	21	15-09-2013
25	Wutsir	Small Pamir	32	19	13	16-09-2013
26	Ghareen	Small Pamir	88	61	27	17-09-2013
27	Nasir Qeraw	Small Pamir	132	85	47	22-09-2013
28	Ghareen Warm	Small Pamir	35	18	17	18-09-2013
29	Gharmdeh Aqbelis	Small Pamir	45	26	19	19-09-2013
30	Bai Qara	Small Pamir	168	91	77	20-09-2013
31	Ghareen Shpodkis	Small Pamir	62	44	18	22-09-2013
32	Sot Vijeetk	Small Pamir	23	12	11	23-09-2013
33	Math Kuf	Small Pamir	63	25	38	23-09-2013
34	Sang Nevishta	Small Pamir	53	30	23	24-09-2013
35	Shikargah (Dorkhon)	Small Pamir	53	37	16	29-09-2013

36	Qaitan Ghareen	Small Pamir	50	16	34	16-09-2013
37	Ghareen Gharmdeh	Small Pamir	56	36	20	18-09-2013
	Subtotal		1025	612	413	
	Grand total		1996	1160	836	

Table 2. Location, number, gender and date of FMD vaccination of cattle by the WCS paravets, Wakhan District, September and October 2013.

No.	Village name	Vaccinated cattle	Sex		Date
			Male	Female	
1	Sarhad-e Broghil	32	14	18	NR
2	Chilkand	4	2	2	NR
3	Ptukh	2	2	0	NR
4	Pak	13	5	8	02-10-2013
5	Pakuy	35	14	21	02-10-2013
6	Khandud	3	3	0	02-10-2013
7	Digargund	26	17	9	03-10-2013
8	Europ	5	4	1	03-10-2013
9	Shkhawar Bala	11	7	4	03-10-2013
10	Wark	14	12	2	03-10-2013
11	Qazideh	82	48	34	04-10-2013
12	Sargez	10	5	5	13-09-2013
13	Goz Khun	20	18	3	14-09-2013
14	Qila-e Panja	27	8	19	15-09-2013
15	Sarkand	8	0	8	15-09-2013
16	Avgarch	27	10	17	15-09-2013
17	Ish Murg	20	12	8	06-10-2013
18	Wergund Bala	10	5	5	06-10-2013
19	Wergund Payan	8	4	4	06-10-2013
Total		358	190	168	

Based on livestock counts carried out in September 2013 we estimated that at least 85% of the yaks older than three month and present in the west of Big Pamir have been vaccinated in 2013. Assuming a comparable vaccination effort, the same proportion of the yak population is believed to have been tagged in the west of Little Pamir. In

contrast to previous years, when FMD vaccination was fully subsidized, the number of cattle vaccinated in September 2013 did not exceed 20% of the cattle population present in mid and upper Wakhan at that time of year.

Discussion

We successfully vaccinated 1,996 yaks and 358 cattle owned by the Wakhi community in upper Wakhan against foot and mouth disease. It shows that even in very remote and neglected areas of Afghanistan, such as Wakhan District, it is feasible to conduct large-scale vaccination campaigns that ensure significant protection of the livestock population against the currently circulating strains of FMDV.

We were disappointed that few people accepted to pay even a negligible fee of 10 Afs/shot (<25% of the cost of a vaccination) to have their cattle efficiently protected against FMD. We took the decision not to offer them this vaccination for free with the hope that the increase of FMD cases in coming years will drive them to accept paying for vaccine protection.

We still offered subsidized FMD vaccination for yaks at the express condition that any vaccinated animal had to be identified with a metal ear tag. This offer was readily accepted by communities. The identification of yaks is for us a first step to better monitor this population of high pasture grazers. It will help us evaluate in the coming years, the productivity of the population, and propose sustainable grazing policies in the buffer zones of the future Big Pamir Wildlife Reserve.

In addition to its main prophylactic benefit, FMD vaccination is also used as a very efficient and largely non-controversial entry point to the remote human community of upper Wakhan (about 550 households were indirectly concerned by this operation or c. 6,500 people). It helps with building a decent level of trust towards vaccination or animal health in general, and even the presence of foreign expertise sometimes regarded with suspicion by local people. WCS has been supporting (financially and logistically) two paraveterinarians in upper Wakhan, and the long-

term sustainability of vaccination campaigns rests on their shoulders. We are developing their capacities with this objective in mind.

In addition to delivering vaccination shots to yaks, we began identifying yaks in April 2013, placing a total of 558 ear-tags, or tag #0001 to #0519 and #0601 to #0639.

In September we identified 1,754 yaks with a metal numbered tag. In the Big Pamir we tagged 951 animals using tag #0520 to #0600, #0646 and then #0649 to #1,517. In Little Pamir we tagged 803 yaks with numbers going from #1,543 to #2,345. With a total of 2,312 yaks identified in 2013, we believe that >85% of the yaks present in the western parts of Big Pamir and Small Pamir have been identified. Yak identification is a first step toward better monitoring this livestock population which is known to come in contact with valuable wildlife ungulate species. We plan to continue ear-tagging yaks in western Big Pamir and Little Pamir in 2014 and anticipate identifying at least 400 yaks (newborns and adults still untagged).

According to our interviewees, because of mild weather conditions during the winter 2012-13, livestock mortality was particularly low. As recorded by paraveterinarians, FMD is nevertheless still actively circulating in lower Wakhan Valley, and in few very remote places in upper Wakhan where no mass vaccination campaigns have taken place.

Acknowledgments

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Finally, we would like to acknowledge the invaluable input of Mr. Sarwar and Mr. Mohammed Gul, the two paraveterinarians in upper Wakhan Valley, and the Wakhi community. Without their help and interest, no work would have been possible in this very remote district of Badakhshan.