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WATER-DEPENDING EPIDEMIC DISEASES IN CENTRAL ASIA (CA)

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Introduction

There was a high level of water-depending: cholera, abdominal typhus, helminthos in CA five states (picture 1) during last century (30s, 40s, and start 50s). For example, malaria illness till 25% of population each year. Bogs dry campaign at the 40s, 50s and massive use of DDT led to the diseases disappearance in 70s – 80s. But it appeared again in CA states at the end of the 90^s due to over-irrigation and Global Warming. “New humid areas” are situated around water reservoirs and over-irrigated cotton and rise fields. Water-depending diseases spreading in Fergana valley and in the Lower of Syr-Darja and Amu-Darja are most intensive, but spread to North CA (Kazakhstan) for latest years.

Additional problem is conserved old biological weapon laboratories of former USSR (supposed: viruses of smallpox and Encephalitis ocarina; microbes of anthrax and plaque). New projects of re-animation of Aral Sea by special dump and ecosystem re-animation can disturb conserved locuses, and wash away the infectious particibles.



Picture 1. Central Asia (Middle East) region Helminthes, Parasites, Bacteria

There are several areas of helminthes, which can live (by ova) in humid warm soil of Fergana valley: ankilostomidosus (near Kyzyl-Kia town); askaridosus (57% samples of water in rivers of Naryn river basin, illness is very wide spread in people of Fergana valley - picture 3); teniarinshos; enterobios; and others.

There are three factors of helminthosis in CA: wide water channel net, dense populated rivers shore and unfortunate habit of village customers. The latest are following: "haus" in home-yard, [hand-made small open basin, which is used for cooking, washing, and bathing]; primitive toilet non isolated from open and ground-water; non-using of toilet paper, etc.

Anthrax storages - cemeteries of cows died of the disease in the 40s-60s are situated very near along the roads (which are used for cattle breeding roam to summer pastures). The roads are from Uzbekistani part of Fergana valley to Alay alpine valley (North Pamir, Kyrgyzstan). The other road (Internal Tien-Shan, Kyrgyzstan): from Chui valley to Suu-Samir alpine valley, from Naryn to Ak-Say valley. We have counted the number of the cemeteries about 350, most of them haven't protection (picture 2). There had been several anthrax cases in human beings in Kyrgyzstan during 2002-05 years.

There are several natural plaque areas in Tien-Shan (in areas: Kens-Anakhai, Sary-Jaz, Upper-Naryn, Aksay, Alay). This infection keeps in marmots and gophers (in wild nature only), but can be transferred by other wild and domestic mammals. There is new mine and channel in the areas, previously absolutely non inhabited. It may provoke danger of epidemic.

Malaria caused by mosquitoes steadfast spreading for latest years (picture 3). It was caused by higher temperature and soil humidify – the results of Global Warming and extensive irrigation. Mosquito species differ by CA zones: An hyrcanus, An caspius, C.modestus – live in Fergana valley, and An hyrcanus - live in Chui valley. An. Hyrcanus live and spawn in small water reservoirs close to settlements. There are 19 such dangerous reservoirs in Almaty and 7 in Bishkek, biggest towns of Kazakhstan and Kyrgyzstan. Mosquitoes can be key carriers for several viruses in expected epidemics, but not only malaria itself. Latest big epidemic of malaria occurred in CA in 2002, and there were over 3500 sick people in Kyrgyzstan and Uzbekistan. Latest data of malaria: 125 cases were fixed in Bishkek (Kyrgyzstani capital), and 93 in Astana (Kazakhstani capital) in spring 2006 only. Additionally, mosquitoes can be key carriers for several viruses in expected epidemics, but not only malaria itself.

Tick Spirochetes area exists in Fergana valley (Kyrgyzstani, Tadjikistani, Uzbekistani, territories). Tick-transfers live in old dwelling near water-melon field.

Abdominal typhus bacteria contains in samples rivers water of CA in summer especially: Karadarja river 20-24%, Ak-Buura 30-40%, Kugart 30-40%, Shahimardan-Say 15-20%, Aravansay 24-35% [first number by our study in 2003-2004, second by Abylgaziev B. study in 80s].

Several epidemics of abdominal typhus in south Kyrgyzstan and east Tojikiston occurred in 1999-2004 years. Five thousands Tojikistoni citizens died in 1997, over 2 thousands hospitalized in 2002 with abdominal typhus.

Situation with water-depending diseases not still better two latest years (tabl 1). Meanwhile, some suppose that most part of cases have not been registrated by official statistic.

Tabl 1

WATER-DEPNDING DISEASES IN KYRGYZSTAN (first half of years 2005/2006)

Diseases	Intensive Rate	% Year-year	Children under 14 years (% from total)
Abdominal Typhus	0,7/0,9	+28,9	27,2% / 35,5%
Salmonellas	2,0/3,3	+60,2	58,9% / 75,2%
Other gastro-intestinal, non recognised	45,2/53,1	+25,3	81,2% / 78,5%

Viruses dangers

Viruses spreading in ticks population, especially *Ix.Perculcatus*, *H.pl.turanicus*, *Arg.Vulgaris*. The ticks infected in 14-34%. And sheep have the mentioned ticks very often.

There have been several cases of other viruses of Tick Encephalitis, Crimea Hemorrhagic Fever for last 20 years in Kyrgyzstani and Uzbekistani aborigines. There are environmental conditions for several other viruses (Fever of Nile, etc), but they have not been registered jet. There is any suspicion on unknown level of such illness (and nature locus), as lack of laboratory equipment for diagnosis.

Old biological weapon laboratories in the former USSR were situated in the islands of the Aral Sea, but now these places dried out, and are situated partly in Kazakhstan and partly in Uzbekistan territories. There was a unexpected outbreak of natural smallpox in 1971 when a woman fish-researcher caught this infection and infected nine people, three of them died. Meanwhile, officially smallpox was totally eliminated in the former USSR, and no vaccination was administered for decades. Photos of the mentioned patients are kept in the Aralsk hospital. Thousands of saigas (steppe goats) died to unknown epidemic in 1984 and 1989; some scientists have suspicions that a biological weapon was the reason. Experts said biological weapon tests led to long-time changes in ecosystems, and rodents in the islands kept several dangerous infections.

Some viruses are spread in ticks, especially *Ix.Perculcatus*, *H.pl.turanicus*, *Arg.Vulgaris*. The forests ticks were infected in 14-34%. And sheep usually have the mentioned ticks. There are tens of cases of Encephalitis ocarina (Encephalitis tick) in Kyrgyzstani citizens every year; 36 cases were officially registered (but many light cases have not been diagnosed). Special immunity research (at the end of the 90s) find the following

level of human infected by area: Encephalitis Ocarina in rural settlements of Chui and Issyk-Kul valleys 15-30%, in rural Osh-Jalalabad region 7-15%; and Sokuluk local (endemic?) virus (member of family Torgovide, class Flaviviridae) 1-2.9% and 0.2-0.35% in mentioned regions respectively; Tamdy and Tjulek local viruses (members of family Bunyamwiri): 1.0-1.9% in Chui and Issyk-Kul valleys and 0.2-0.3% in Osh-Jalalabad region. There are viruses difference by areas and vertical lies in TienShan-Pamir region, in First and Second zones – good for viruses, in Third – satisfactory zone, Fourth and Fifth – unfortunate for viruses (and transfers) - see tabl 2.

Tabl 2

VERTICAL CLIMATIC ZONES FOR VIRUS IN TIENSHAN-PAMIR

Zones	Hight above sea level	Effective temperature (>10 C)	Jule average temperature	Number of Days above 10°
First	600 - 1200 m	3000 - 4500	21,6 - 27,4	170 - 211
Second	above 1200 - 1800 m	2600 - 2900	19,0 - 20,5	160 - 174
Third	above 1530 - 2800	1635 - 2500	15,4 - 18,8	128 - 160
Fourth	above 2000 - 2800 m	430 - 1400	10,5 - 13,6	40 - 91
Fifth	above 3000 and higher	0 - 300	0,1 - 10,2	0 - 28

Additionally about area differ of viruses: in Internal Tien-Shan territory - mostly *D.Marginatus*, *H.Punctata*, but in Fergana valley plane: *H.asiaticum*, *H. pl.turanicum*.

Rabies disease wide spreading in wild and in domestic animals (dogs, cow, sheep). Over 120 cases in animals were identified in-vitro in 2005 in Kyrgyzstan, and three human cases of death due to hydrophobia - in last year.



Pictire 2. Former medical warehouse (contains antrax and others) without wire obstacle.

A new danger is bird influence: it is stressed by several officials and scientists in Central Asia, as a lot of birds (from Indo-China) migrate via the region and most of them land temporarily in alpine lakes (picture 3). The Kyrgyzstan National Plan for Prophylaxes and Resistance of Bird Influence (based on same Plan of Thailand) has been designed (at spring of 2006), and three viral laboratories for this purpose have been set up.

Conclusion

We estimated close correlations between - soil humidify on one hand, and, several diseases - on the other hand. We have done complex prognosis by map-map comparison, ranking correlation [Hadjamberdiev I., 1996], scenario mathematical methods [Diseases Mapping, 1999]. There is bad prognosis about epidemics in CA for the nearest 10-20 years. The study of our regional epidemic-emergency research has been offer for inclusion to several regional (CA), and National Programs.

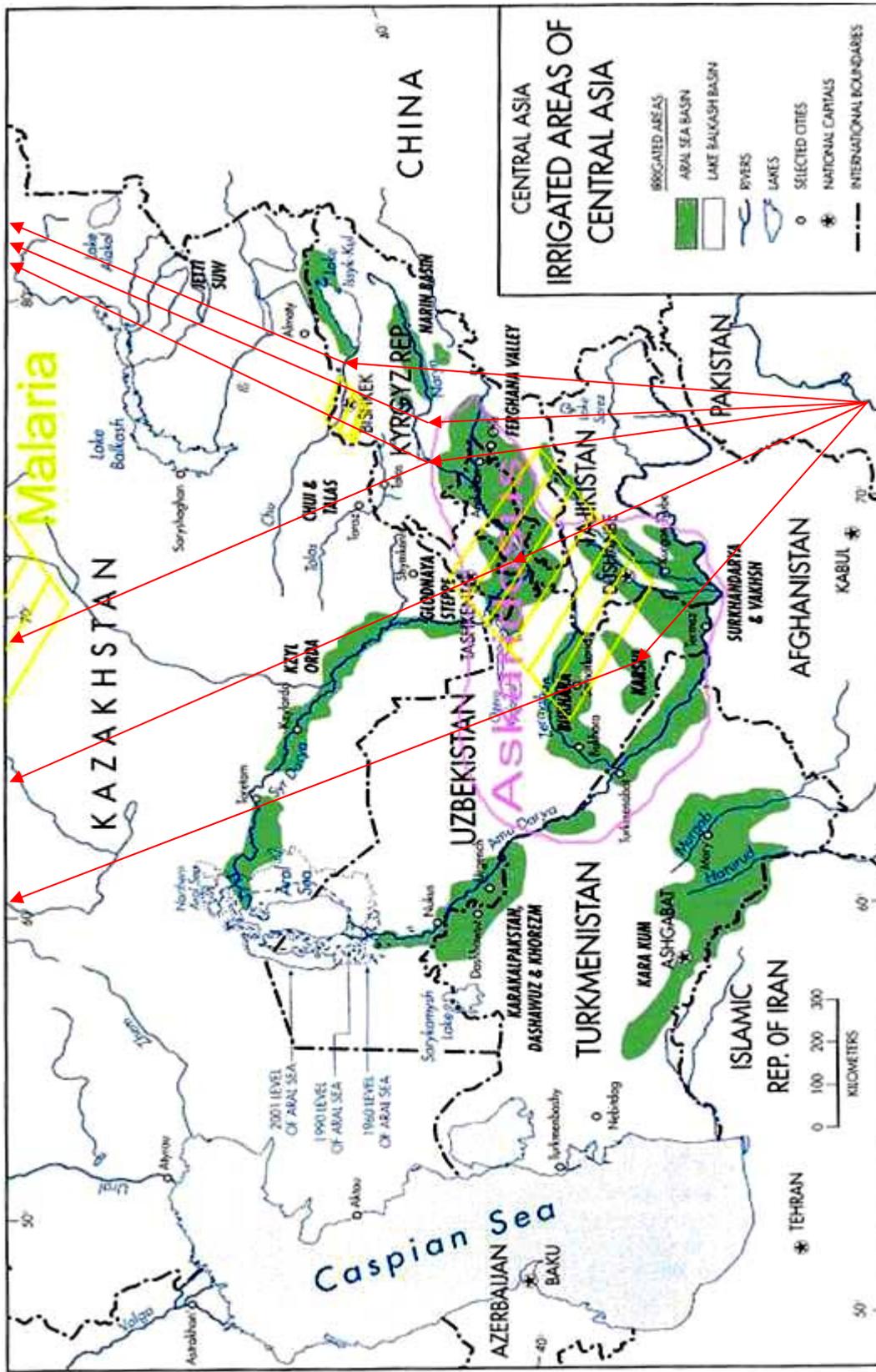
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North Russia

Russian Siberia



IndoChina

Bird Migration

Picture 3. Area of water-dependent diseases