Brucellosis - Country perspective

Preventing animal and human infections in the Republic of Croatia

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Animal population in Croatia, October 2013

Bovines: 433,000 (36,000 farms)

Pigs: 1.1 – 1.2 mil. (67,000 farms)

Small ruminants: 727,000 (19,000 farms)
Basic Legislation Framework

- Veterinary Act (OG 82/2013)
- Order on measures to protect animals from infectious and parasitic diseases and the financing thereof in 2013 (OG 03/13)
- Ordinance on the notification of animal diseases (OG 62/11, 114/11)
About Brucellosis

- one of the most important and widespread zoonozes in the world (tuberculosis and rabies)
- well controlled in most developed countries
- rare in industrialized nations
- clinical disease still common in Middle East, Asia, Africa, South and Central America, the Mediterranean Basin and Caribbean
chronic infectious disease caused by bacteria of the genus Brucella

able to infect other animal species, which tend to infect a specific animal species

in humans, brucellosis can be caused by:

- *B. Abortus*
- *B. Melitensis*
- *B. Suis* (biovar 1-4) and
- *B. Canis* (rarely)
About Brucellosis

- in animals is characterized by abortions and reproductive failure
- animals typically recover but may continue to shed the bacteria
- brucellosis in cattle (B. Abortus); in sheep and goats (B. Melitensis) and in swine (B. Suis) are diseases listed in the OIE Terrestrial Animal Health Code
- sheep and goats and their products are the main sources of infection (fresh unpasteurized goat cheese and raw fresh (untreated) milk)
- risk for farmers, veterinaries, employees in the meatpacking business
Bovine brucellosis (*Brucella abortus*)

- the last case of *B. abortus* in Croatia was confirmed in 1965

- measures of **active control** and **early detecting** have been systematically implemented during the last two decades

- measures set out by the, yearly prescribed **Order** have been changed several times in period since 1991 – 2010, but mandatory reporting and laboratory investigation of each **abortion** in cattle and **premovement testing** of bovine animals older than 12 months were constantly the part of control measures.
Bovine brucellosis (*Brucella abortus*)

- testing scheme of control were combination of bulk milk sampling and individual blood testing, especially in holdings with more than 10 dairy cows

- in period 2007 – 2009 proscribed measures:
  a) Mandatory reporting of all abortions and laboratory investigation.
  b) Blood sampling of 20% cows in all herds with more than 10 cattle. Also, blood samples of all heifers, before first lactation, had to be taken in such herds.
  c) Premovement testing for all breeding cattle older than 12 months.
  d) Blood sampling of all breeding bulls, twice per year.
Bovine brucellosis (*Brucella abortus*)

- In year **2010** blood tests at herd level were not prescribed.
- From **2011** control measures and surveillance were aligned with **CD 64/432/EEC** in order to grant OBF status to bovine herds.
- **2011** - first year of the official eradication program.
Bovine brucellosis (*Brucella abortus*)

Herds with >10 dairy cows

- 3 bulk milk samples (March, June, September) + individual blood sample (*autumn 2011*) ⇒ grant of status
- Retested through two bulk milk sampling tests (*March and June 2012*) ⇒ maintenance of status
- Retested (*autumn 2013*) through individual blood sampling ⇒ maintenance of status

Herds with <10 dairy cows:

- Blood sampling (*autumn 2011*),
- Another blood sampling (*spring 2012*) ⇒ grant of status
- Retested (*autumn 2013*) through individual blood sampling ⇒ maintenance of status
Bovine brucellosis (*Brucella abortus*)

- **Summer 2012** -> officially brucellosis free herds (diary); only milk from officially free holdings is collected for export in EU (Regulation No 853/2004)

- **Autumn 2013** -> individual blood sampling, all breeding animals >12 months

- **Autumn 2013** - more than 90% of the bovine herds in Croatia are officially brucellosis free (OBF)

- **End of 2013** - more than 99.8% of bovine herds will be considered as OBF by the end of 2013

- **Fattening herds** have not been tested as the part of the program - all imported fattening animals originated from OBF countries or OBF herds

- **By 2014**, almost all fattening herds will comprise animals that originated from OBF herds
Bovine brucellosis (*Brucella abortus*)

Total number of individual blood tests performed in the period 2008-2011 and number of abortions in cattle, reported and sampled for laboratory examination

***There was no any case of B. abortus infection confirmed***

<table>
<thead>
<tr>
<th>Year</th>
<th>Total number of individual blood tests performed</th>
<th>Reported abortions (laboratory examination)</th>
<th>Premovement tests</th>
<th>Ordered control measures in the herds</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
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<td>2010</td>
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<td>2009</td>
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</tr>
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<td>2008</td>
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<td>751</td>
<td>2296</td>
<td>56796</td>
</tr>
</tbody>
</table>
Bovine brucellosis (*Brucella abortus*)

- bulk milk samples were tested using Milk ELISA tests
- screening blood test is Rose Bengal Test (RBT)
- confirmation: RBT, CFT, iELISA, cELISA
- in all positive cases, samples at slaughterhouse must be taken and sent to Croatian veterinary Institute for further laboratory examination
- diagnostic methods in accordance with OIE Terrestrial Manual
Bovine brucellosis (*Brucella abortus*)

- According to actual **Ordinance on notification of animal diseases** (Official Gazette, 62/11, 114/11), bovine brucellosis is compulsory notifiable disease.

- OIE-listed disease.

- According to **Ordinance on measures for control and eradication of bovine brucellosis** (Official Gazette, 112/2013), “test and slaughter” strategy is prescribed; all positive animals should be slaughtered, inside 30 days of positive test result.
Conclusions

- **last case** of Bovine Brucellosis was confirmed in 1965.

- current official eradication program (brucellosis free status of bovine herds) co-financed from EU

- objective for the year 2013/2014 is to achieve percentage of OBF herds higher than 99.8% at the end of the year

- placing bovine animals on the market throughout the territory of the EU
Goat and sheep Brucellosis (Brucella melitensis)

- Occasionally (sporadically), near the border with BiH
- All occurrences have resulted from epizooty originating in the neighboring country of BiH
- In 2008… 8 outbreaks were confirmed
- In 2008 B. melitensis in caws was confirmed for the first time in Croatia
- In 2009… 1 outbreak
- In 2010… 6 outbreaks (Lika-senj and Split-dalmatia counties)
- Last case in October 2013
Goat and sheep Brucellosis  
(Bruceella melitensis)

- measures of **active control** and **early detecting** have been systematically implemented during the last two decades

- the control and active surveillance program allowed rapid detection of the disease; affected area in Croatia were small

- controlled in accordance with the annual order
all abortions must be notified
serologically tested for brucellosis:
(a) the blood of newly acquired rams and male goats including breeding sheep and goats, prior to their being introduced to the farm;
(b) the blood of rams and male goats before their use for artificial insemination or for natural mating;
(c) twice a year, the blood of rams and male goats used for the production of semen used for artificial insemination and for natural mating;
(d) the blood of all breeding rams and male goats, and of breeding sheep and goats, before they are marketed provided that the test result is less than 30 days old.
Goat and sheep Brucellosis
(\textit{Brucella melitensis})

Additional measures in 2009, 2010 i 2011:

- testing of all sheep and goats older than 6 months once a year, leatest before expulsion to pasture in:

- Karlovac county

- Split- dalmatia county (exception of islands)
Goat and sheep Brucellosis (Brucella melitensis)

- In **2012** started program fully aligned with Council Directive 91/68/EEC (animal health conditions governing intra-Community trade in ovine and caprine animals set out the requirements for holdings member states or regions to be considered officially brucellosis free)

- **autumn 2012 (September – December)**: all mixed and dairy herds (72,000 animals) were included in program (about 11% of total S&G population)

- 695 dairy holdings were tested (320 situated on the island of Pag)
Goat and sheep Brucellosis
(Brucella melitensis)

- In 2012 there were 112 sheep and goats blood tested for B. melitensis following abortions; few submissions of placenta and fetuses for bacteriological investigation took place.

- The pre-movement testing of breeding sheep and goats before they are permitted to move onto dairy holdings and the individual testing of breeding males on all sheep and goat holdings prior of their use for breeding.

- Another test — March – June 2013 (75 000 animals tested/727 herds) ➔ grant of status.

- 2014 ➔ maintenance of status.
Conclusions

- cooperation of the veterinary services at the both sides of the Croatia and Bosna-Herzegovina border must be present

- farmers educations

- prevention of uncontrolled circulation of animals

- from 2014 it is intended to include all small ruminant holdings in the surveillance program for *B. melitensis*

- Croatia at present time cannot be considered as an officially brucellosis-free territory due to:
  - non-representative sampling program of the sheep and goat holdings
  - low number of submissions of both tissues (aborted fetus/placenta) and blood samples from aborted ewes for serological examination
Brucella melitensis in 2010
Ličko-senjska county 4 outbreaks
Municipality Plitvička jezera
affected 10 sheep, 7 goats, 143 mixed sheep/goats
Porcine brucellosis (Brucella suis)

- Porcine brucellosis occurs only in small extensive rearing and source of infection is contact with the reservoir - wild boars.

- 2003 - first evidence of *B. suis* biovar 3 infection in pigs, wild boars and horses in Europe.

- 2 potential ways of spread:
  1. following the introduction of affected animals
  2. swine kept at pasture (direct or indirect contact with infected wild boars)

- so far in Croatia in humans has not been determinate infection with *B. Suis* (long tradition of livestock keeping) ⇒ Croatian isolates of *B. suis* have no zoonotic potential.
Porcine brucellosis
(\textit{Brucella suis})

- it was one investigation during 2001 and 2002 (seven different localities; the blood samples from 514 wild boar); the aim was to demonstrate the level of prevalence of brucellosis in wild boar

- in all of the wild boar from all of the localities investigated positive reactions to brucellosis were established

  - \textit{B. suis} biovar 2 was isolated from 18 animals that originated from all of the localities investigated (PCR)
  
  - based on results (CVI) it could be concluded that in Croatia wild boar are natural vector and/or reservoir of \textit{B. suis} biovar 2 (enzootic in Croatian populations of wild boar)
measures are proscribed by Ordinance on measures for control and eradication of porcine brucellosis (Official Gazette 86/12); all seropositive animals must be slaughtered
<table>
<thead>
<tr>
<th>Year</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003-2009</td>
<td>All cases of abortion and the presence of clinical signs in breeding pigs must be notified; authorised vet. must take samples and send them to official lab. The blood of sows once a year on the farms with 10 to 50 head of animals and blood of 20% sows on the farms with more than 50 heads of animals. The blood of newly acquired swine animals before their introduction onto the farm. Twice a year mandatory testing for brucellosis in all extensively farmed boars.</td>
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<tr>
<td>2010</td>
<td>All cases of abortion and the presence of the presence of clinical signs in breeding pigs must be notified; authorised vet. must take samples and send them to official lab. The following must be serologically tested for brucellosis: (a) once a year, the blood from: - all sows and gilts from the breeding unit containing 10 to 20 sows and gilts; - 21 to 25 sows and gilts from the breeding unit containing 21 to 30 sows and gilts; - 26 sows and gilts from the breeding unit containing 31 to 40 sows and gilts; - 31 sows and gilts from the breeding unit containing 41 to 50 sows and gilts; - 35 sows and gilts from the breeding unit containing 51 to 60 sows and gilts; - 38 sows and gilts from the breeding unit containing 61 to 70 sows and gilts; - 40 sows containing 71 to 80 sows and gilts; - 42 sows containing 81 to 90 sows and gilts; - 43 sows containing 91 to 100 sows and gilts; - 49 sows containing 101 to 200 sows and gilts; - 53 sows containing 201 to 300 sows and gilts; - 59 sows and gilts from the breeding unit containing more than 300 sows and gilts; (b) the blood of boars before their use for artificial insemination or for natural mating; (c) twice a year, the blood of boars used for the production of semen used for artificial insemination and for natural mating.</td>
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<tr>
<td>2011</td>
<td>All cases of abortion and the presence of the presence of clinical signs in breeding pigs must be notified; authorised vet. must take samples and send them to official lab. The blood of boars shall be tested once a year (before artificial insemination or natural mating).</td>
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<td>2012</td>
<td>All cases of abortion and the presence of the presence of clinical signs in breeding pigs must be notified; authorised vet. must take samples and send them to official lab. Boars may be admitted to an approved semen center if they are tested with negative results during 30 days prior to admission. Boars kept in approved semen centers must be tested with negative results at least every 12 months.</td>
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<td>2013</td>
<td>All cases of abortion and the presence of the presence of clinical signs in breeding pigs must be notified; authorised vet. must take samples and send them to official lab. Boars may be admitted to an approved semen center if they are tested with negative results during 30 days prior to admission. Boars kept in approved semen centers must be tested with negative results at least every 12 months.</td>
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<tr>
<td>Year</td>
<td>Number of outbreaks</td>
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Human brucellosis

- has been notified disease since 1960.
- in 2004 occurred human brucellosis in a rural area of southern Croatia near the border of BiH; no documented case of human brucellosis had previously been reported in southern Croatia.
- clinicians should consider the diagnosis of brucellosis among febrile patients who had direct contact with livestock before onset the fever.
- this emphasize the importance of cooperation between physicians and veterinarians because prevention of brucellosis in humans is dependant on control and eradication of the disease in livestock.
## Incidence in humans 2000-2013

<table>
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<th>Year</th>
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Thank You for attention!