

**4<sup>th</sup> FAO-APHCA/OIE/DLD Regional Workshop on  
Brucellosis Diagnosis and Control in Asia-Pacific Region  
“Proficiency Test and Way Forward”  
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**Brucellosis- Indian Scenario**



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# INDIA

- ✓ India is a country of sub-continental proportions
- ✓ Total area 3.29 million sq. kms.  
(2.4% area of world holding 16.7% human population)
- ✓ **29 States and 7 Union territories**
- ✓ Population = 1,270,272,105 persons.
- ✓ Sex ratio = 940 females Vs 1000 males



## **Livestock Wealth of INDIA**

**Total Livestock population                      522.7 million**

- ✓ **Largest buffalo population in the world (105.34 million- 57.3%)**
- ✓ **2<sup>nd</sup> largest cattle population                      (199.08 million- 14.7%)**
- ✓ **2<sup>nd</sup> largest goat population                      (140.54 million- 16.7%)**
- ✓ **3<sup>rd</sup> largest sheep population                      (71.56 million- 12.4%)**
- ✓ **5<sup>th</sup> largest Poultry population                      (648.88 million- 24.7%)**
- ✓ **6<sup>th</sup> largest camel population                      (0.52 million- 29.31%)**
- ✓ **Canine population                      (19.9 million)**

**(Census 2007)**



## **Contribution to Animal Products**

- ✓ **Largest producer of milk in the world (121.8 million tons)**
- ✓ **3rd largest producer of Chicken eggs (66 billion)**
- ✓ **4th highest poultry meat producer (3.4 million tons)**

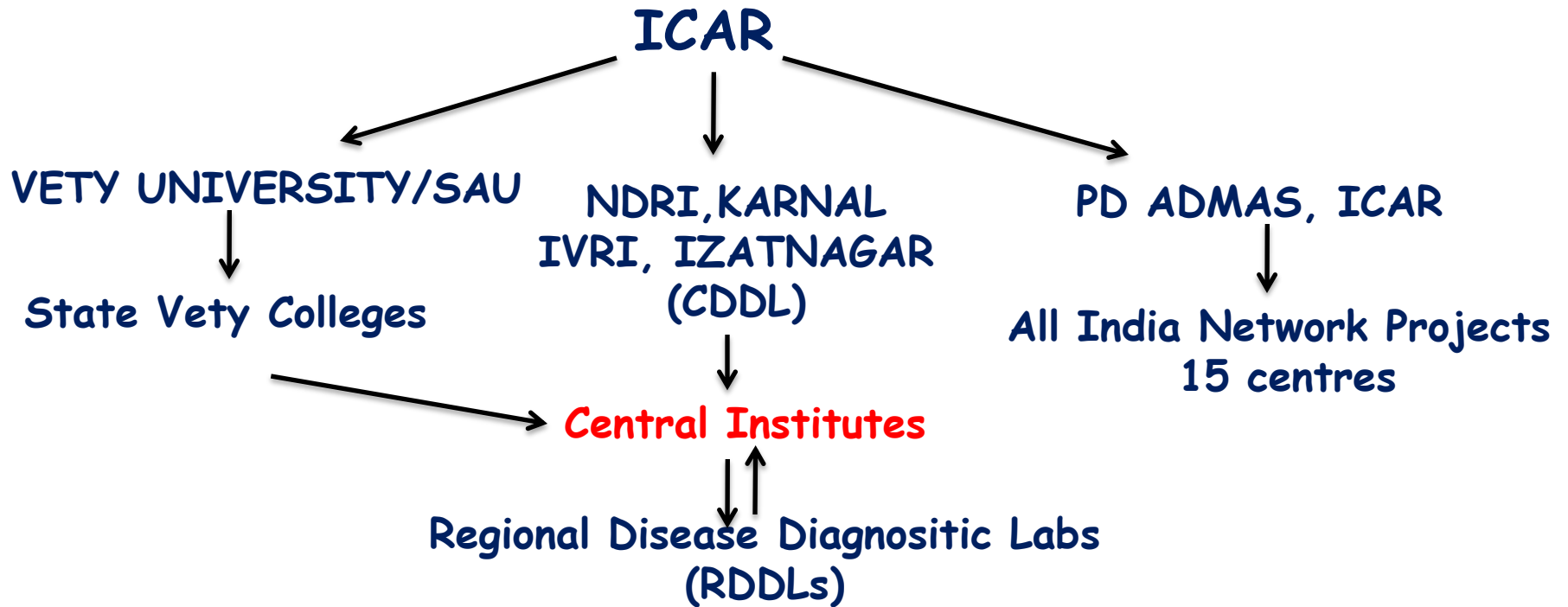


## **Veterinary Services in India (Federal Government)**

- **At the Federal (Central) level, a Central Cabinet Minister heads Ministry of Agriculture having control of three Departments :**
- **Department of Animal Husbandry, Dairying and Fisheries (DADF)**
- **Department of Agriculture and Cooperation (DOAC)**
- **Department of Agricultural Research & Education (DARE)**



# Laboratory Setup





# INDIA

## States and Union Territories

Location of  
Regional Disease  
Diagnostic  
Laboratories  
in India

→





## Brucellosis Situation in Animals

- Seroprevalence of brucellosis in goats and humans in Bikaner district of Rajasthan reveals **11.45%** prevalence in milch goats and **2.97%** in humans. (Kapoor *et al* 1985).
- Serological survey of brucellosis was performed in 23 states of India. A total of 30,437 bovine samples were screened with RBPT and STAT which reveals **1.9% prevalence in cattle** and **1.8% in buffaloes**. (Isloor *et al* 1998).
- PD-ADMAS conducted long-term serological studies which indicated **5% of cattle** and **3% of buffaloes** are infected with brucellosis. (Rajasekhar *et al* 2002).
- Sero-prevalence of brucellosis in Mithun (*Bos frontalis*) in Nagaland state by ELISA, STAT and RBPT is **34%**, **20%** and **11%** respectively (Rajkhowa *et al* 2004).
- Serological study of *B. melitensis* with RBPT, STAT and ELISA reveals incidence of **13.85%**, **9.96%** and **20.35%** in Tamil Nadu State (Maher Sulima *et al* 2006).
- Prevalence rate for brucellosis was **8.58% in cattle**, **8.85% in goat** and **7.08% in sheep** from the states of Rajasthan and Bihar. (Singh, 2007).
- Prevalence was **40.4%** in bovines by AB-ELISA in Maharashtra State. (Lodhe *et al* 2011).





# Brucellosis Situation in Animals....

## In Punjab State

### Cattle and Buffaloes

- The Avidin biotin ELISA in sera samples from 52 villages of Punjab state revealed prevalence in **Buffaloes was 13.4%** and in **Cattle was 9.9%** (Dhand *et al* 2005).
- Milk-ELISA in 345 animals from 32 villages, **18.26%** of animals were found positive (Aulakh *et al* 2008).

### Caprines

- Dot-ELISA and STAT, **4.0%** were found positive (Singh *et al* 2000).



## **Sero-prevalence of Brucellosis in Punjab State GADVASU, Ludhiana**

<b>Year</b>	<b>Suspected Sample Tested</b>	<b>Positive By RBPT</b>	<b>% Positive</b>
<b>2007-08</b>	<b>1603</b>	<b>420</b>	<b>26.20</b>
<b>2008-09</b>	<b>2961</b>	<b>829</b>	<b>27.90</b>
<b>2009-10</b>	<b>2588</b>	<b>829</b>	<b>32.03</b>
<b>2010-11</b>	<b>2689</b>	<b>775</b>	<b>28.82</b>
<b>2011-12</b>	<b>1064</b>	<b>191</b>	<b>17.80</b>
<b>2012-13</b>	<b>662</b>	<b>95</b>	<b>14.32</b>

**Annual reports-ADRC**



## Sero-prevalence of Brucellosis in Northern States

<b>Year</b>	<b>Random Sample Tested</b>	<b>Positive</b>	<b>%</b>
<b>2003-04</b>	<b>19692</b>	<b>1615</b>	<b>8.20</b>
<b>2004-05</b>	<b>14968</b>	<b>564</b>	<b>3.70</b>
<b>2005-06</b>	<b>16806</b>	<b>122</b>	<b>1.10</b>
<b>2006-07</b>	<b>13906</b>	<b>431</b>	<b>3.09</b>
<b>2008-09</b>	<b>1861</b>	<b>163</b>	<b>8.76</b>

**(Annual reports-NRDDL)**



## Brucellosis in Western States

State	Sample tested	Positive	% Positive
Gujarat	260	82	31.54
Maharastra	941	328	34.86
Rajasthan	39	5	12.82
Madhya Pradesh	2795	575	20.57
Uttar Pradesh	712	294	41.29

## Brucellosis in Eastern States

Manipur	700	2	0.28%
Assam	395	0	-
Mizoram	676	38	5.62%

## Brucellosis in Southern States

Andhra Pradesh	2843	122	4.3%
Kerla	1361	109	8.0%
Karnataka	10767	402	3.8%



# Brucellosis Situation in Human Population

- Sero-prevalence of **5.8 to 14.3%** in veterinary workers and of **8.5%** in general population of Belgaum. (Bhat *et al* in 1997).
- In Kashmir area (1992-1997) a total of 3532 patients of FUO were screened by Wright's tube agglutination test, out of which **28 (0.8%)** were found positive. (Kadri *et al* 2000).
- Chronic brucellosis was noticed in **28 (6.8%)** patients with fever of unknown origin out of 414 studied. (Sen *et al* 2002).
- In 2003, an outbreak of brucellosis was studied in HP state of North India and Serological study revealed **10%** of contact animal handlers.(Chahota *et al* 2003).
- 292 Blood samples of blood donors were collected in Postgraduate Institute of Medical Sciences, Chandigarh, Punjab for sero-monitoring of brucellosis. **One case found positive** and one was doubtful.(Vaishnavi *et al* 2007).



## HUMAN BRUCELLOSIS IN PUNJAB STATE

<b>Year</b>	<b>Total Samples</b>	<b>Positive Samples</b>	<b>% Positive</b>
<b>Upto 2002</b>	<b>2430</b>	<b>383</b>	<b>15.8%</b>
<b>2003</b>	<b>139</b>	<b>40</b>	<b>28.7%</b>
<b>2004</b>	<b>905</b>	<b>95</b>	<b>10.5%</b>
<b>2005</b>	<b>430</b>	<b>44</b>	<b>10.2%</b>
<b>2006</b>	<b>297</b>	<b>44</b>	<b>14.8%</b>
<b>2007</b>	<b>175</b>	<b>47</b>	<b>26.8%</b>
<b>2008</b>	<b>241</b>	<b>64</b>	<b>26.6%</b>



## Human Brucellosis.....

Occupation	RBPT	STAT	Incidence on basis of RBPT
Veterinarians (N=118)	13	13	11.01 %
Veterinary paraclinical staff (N= 87)	22	20	25.28 %
Dairy farmers (N=62)	10	10	16.10%
Total (267)	45	43	<b>16.85%</b>

School of Veterinary Public Health-  
2012-13



## **Canine Brucellosis in Punjab State**

<b>Total no of canine serum samples analyzed</b>	<b>112</b>
<b>Serologically positive samples</b>	<b>9.8%</b>
<b>Positive among showing clinical symptoms</b> (Abortion, orchitis, anorexia, persistent Temperature, itching etc.)	<b>32.6%</b>



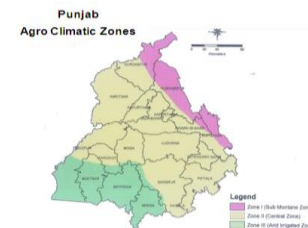
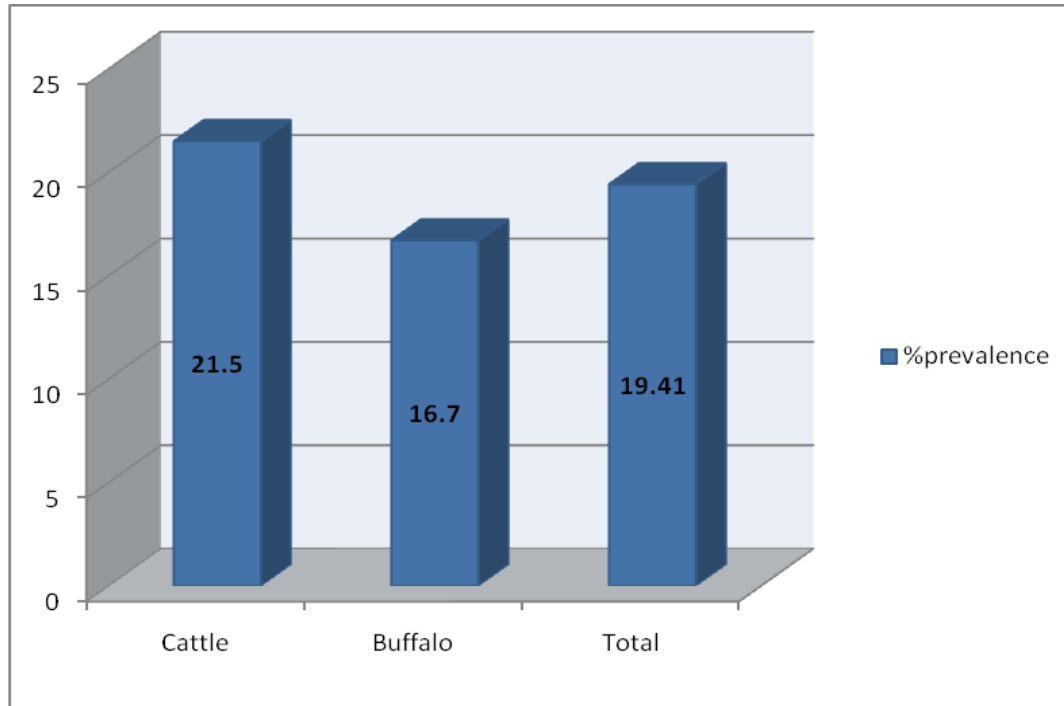


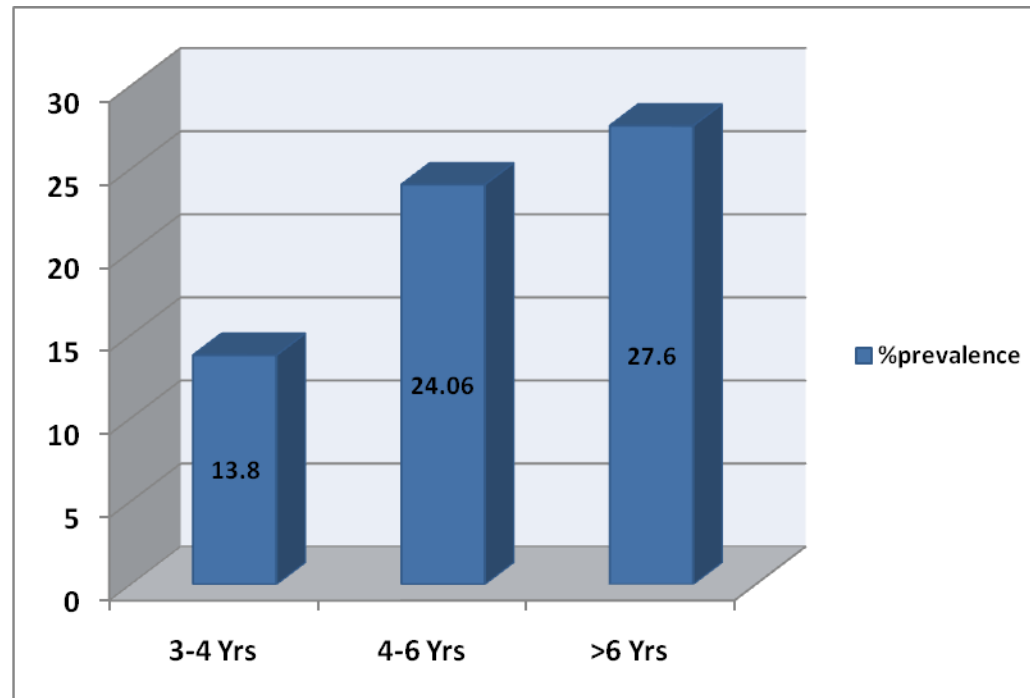
Fig. 2: Agro climatic zones of Punjab

## Zone wise sero-prevalence of brucellosis in Punjab State

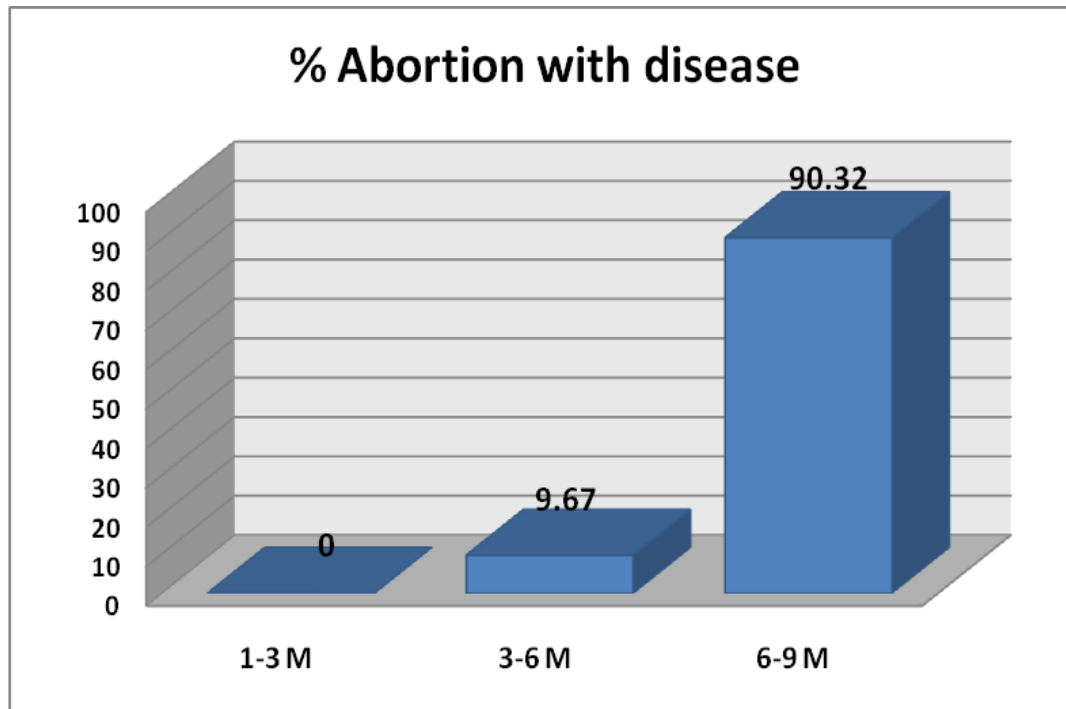
Zone	Cattle			Buffalo			Overall prevalence (%)
	Tested	Positive	% prevalence	Tested	Positive	% prevalence	
I Sub-mountainous Zone	28	3	10.71	34	8	23.52	17.74
II Central Zone	188	50	26.59	148	27	18.24	22.91
III Arid Irrigated Zone	48	4	8.33	33	1	3.03	6.17



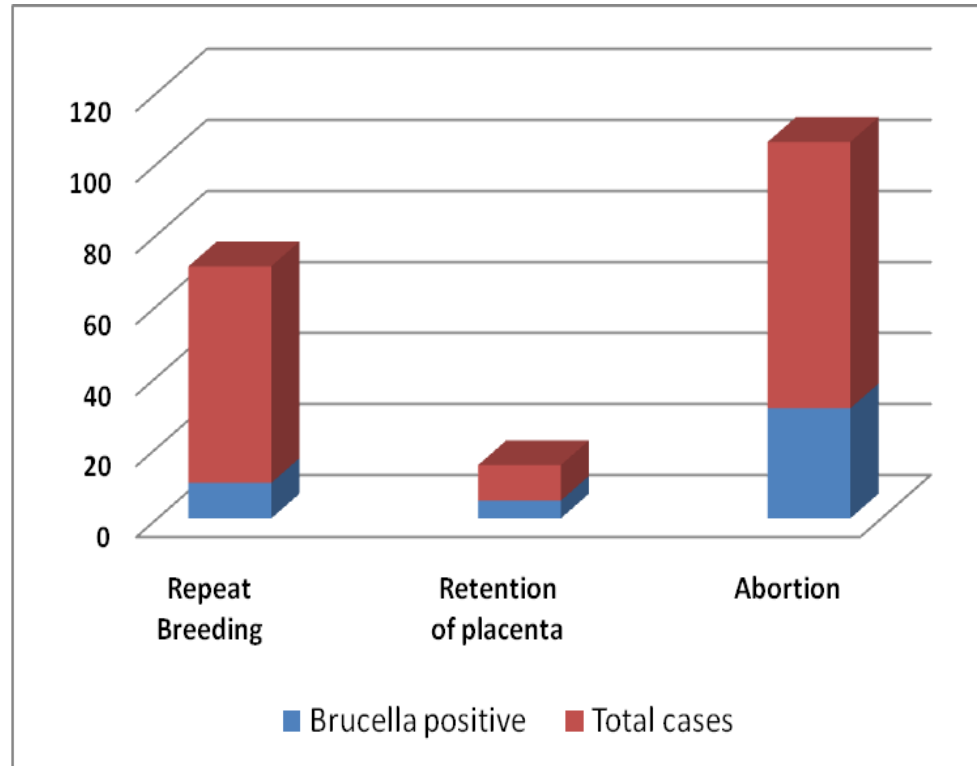
## Species wise sero-prevalence of brucellosis in Punjab State



**Age wise Sero-prevalence of brucellosis in Punjab State**



**Relationship between month of gestation and abortion in cows and buffaloes affected with brucellosis in Punjab State**



**Relationship of abortion, Retention of Placenta and Repeat Breeding with brucellosis**



## **Surveillance Program and Diagnostic Strategy**

- **For sero-surveillance, Milk Ring Test is applied on bulk tank samples.**
- **The suspected herds are screened with Rose Bengal Plate Test and positive reactors are confirmed with Tube Agglutination Test and indirect ELISA.**
- **Isolation, identification and molecular characterization of the organism.**
- **Segregation of positive animals and no slaughter of positive animals.**



## **Work under progress**

- **Sero-surveillance using RBPT, STAT, ELISA**
- **To compare the polymerase chain reaction (PCR) based techniques with conventional bacteriological techniques employed for diagnosis of brucellosis.**
- **Bruce-ladder multiplex PCR to differentiate various *Brucella* species.**
- **Real time PCR and LAMP standardised for detection of *Brucella* sp.**
- **Fluorescent polarisation assay is under going standardisation process.**
- **Cloning, expression and purification of different OMPs.**



# Asia Pacific Bovine Brucellosis Serum Proficiency Test 2013

<b>RBPT</b> Test performed on 27.12.13 Antigen batch no RBA 0513 Expiry date Sep 2015				<b>iELISA</b> Test performed on 28.12.13 Kit- Idexx lab, Batch no 220-z751, Expiry date 30.6.14		
Sample No	Tube No	Result	Interpretation	OD	Calculating Index	Interpretation (Positive >80%)
1	92	++++	P	0.8052	120.46	P
2	312	++++	P	0.8434	126.65	P
3	267	++++	P	0.83105	124.65	P
4	173	++++	P	0.84915	127.59	P
5	446	0	N	0.68575	101.11	P
6	509	++	P	0.65725	96.50	P
7	611	0	N	0.6657	97.86	P
8	794	++	P	0.82665	123.94	P
9	827	0	N	0.0778	2.624	N
10	1132	++	P	0.7944	118.72	P
11	1208	++++	P	0.81075	121.36	P
12	1370	++++	P	0.8215	123.11	P
13	918	0	N	0.2218	25.95	N
14	1569	0	N	0.0751	2.18	N
15	1477	0	N	0.17475	18.33	N
16	1603	++	P	0.81515	122.08	P
17	1037	++	P	0.81085	121.38	P





**THANKS**