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Control of Bang's Disease in Missouri

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COLUMBIA, MISSOURI

SUMMARY

Data compiled in this bulletin represent the progress that has been made in the control of Bang's disease in Missouri. The percentage of reactors found on the first test was interpreted as indicating the amount of infection in those particular herds. A study made of the amount of infection found upon retests of those same herds showed a marked reduction. This reduction may be interpreted as progress in reducing infection in Missouri cattle. Percentage of initial infection and that found on retests are shown by county, in both tabular and graphic form.

Discussions on management of herds to keep them free of disease, and on the problem of replacement cattle have been included. Reasons for certain herds not cleaning up on a series of tests, and figures from a recent summary of the Bang's disease testing program in the United States may be found in the bulletin.

ACKNOWLEDGMENTS

The data contained in this bulletin have been compiled from the records in the Department of Veterinary Science, Missouri Agricultural Experiment Station. These records have been made available because of the work carried on in Missouri in connection with the Bang's disease control program conducted by the Bureau of Animal Industry, U. S. Department of Agriculture.

The Bang's disease testing laboratory in the department of Veterinary Science is the official laboratory in connection with the blood testing for Bang's disease in this state.

We wish to express our appreciation to the Bureau of Animal Industry, as it is due to their excellent work in this state that these records have been available for study. We wish to thank Dr. Ralph Graham, Inspector in Charge, and Dr. Fred M. Shigley, both of the Bureau of Animal Industry and located in Missouri.

Control of Bang's Disease in Missouri

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For many years cattle owners in Missouri have been having trouble with Bang's disease, the condition formerly known as contagious or infectious abortion. Early work at the Experiment Station, Missouri College of Agriculture, has shown that it was possible to control the spread of this disease by means of serological tests. In the first work conducted the complement fixation test was used, but the number of samples tested increased so rapidly that this test was discarded as impractical and the tube agglutination test was adopted. It is interesting to note that the plan of control outlined years ago, based upon results of the experiment work carried on by Dr. J. W. Connaway* and associates, was quite similar to the general plan that is being used at present.

On July 1, 1934, funds became available to the Bureau of Animal Industry for the control of Bang's disease. It was not until the fall of that same year that the federal work started in Missouri. At first cattle were tested only in small numbers, but plans were made for enlarging the program of work in this state. Cattle that were tested were owned by Missouri farmers, but only those owners who were willing to sign a contract with the Bureau of Animal Industry were able to have their herds tested under this program. The Veterinary Department, College of Agriculture, University of Missouri, has cooperated in this program of work and the official blood testing laboratory for this state is located in that department. To date all of the blood tests that have been made have been conducted in this laboratory. For many years we have made private tests for cattle owners in Missouri, so when this latter program started it was only necessary to expand facilities already available and increase the carrying capacity of the laboratory.

The test which has been used in this work is the tube agglutination test. In conjunction with the tube test, or official test, plate tests have been used where it seemed advisable and for check testing purposes. For many years the tube agglutination test was set up in four dilutions, namely 1-25, 1-50, 1-100, and 1-200. After

*Connaway, J. W. Prevention and Eradication of Infectious Abortion in Cattle. Missouri Agr. Exp. Sta. Bul. 290 (1930).

testing several thousand samples on this basis and collecting data upon the results it was decided unnecessary to include the 1-25 dilution in our routine work. In view of this fact we continued with a four dilutions test, but set the test up in dilutions of 1-50, 1-100, 1-200 and 1-400. Interpretations of our results have always been made as shown in the accompanying table.

TABLE 1.—INTERPRETATION OF TUBE AGGLUTINATION TEST

Test Dilutions				Classification of animal
1–50	1–100	1–200	1–400	
−	−	−	−	Non-reactor
I	−	−	−	Suspect
+	−	−	−	Suspect
+	I	−	−	Suspect
+	+	−	−	Reactor
+	+	I	−	Reactor
+	+	+	−	Reactor
+	+	+	I	Reactor
+	+	+	+	Reactor

Key to table: −, No agglutination; I, Incomplete Agglutination; +, Complete Agglutination.

The term reactor should not be interpreted as meaning the cow ever did or ever will abort. A positive reaction or reactor indicates that the animal has been, or is infected at the time of the test, with *Brucella abortus*, the organism which causes Bang's disease. A non-reactor, or a negative test, indicates that at the time the animal was tested it showed no indication of having Bang's disease infection. A single test, however, is not conclusive evidence that this is true, but a series of negative reactions is fairly good evidence that such is the case. A non-reactor should not be interpreted as meaning a cow will carry a full-time calf or that there will be no danger from that animal aborting in the gestation period following the test. A non-reactor is always susceptible to infection and may contract the disease at any time. An animal giving a negative reaction, if properly protected from Bang's disease exposure, is most likely to go through the breeding season with a minimum amount of trouble. A suspect reaction, is recorded for those animals which fail to give a completely negative test but still show too much agglutination to classify them safely as non-reactors. Some suspects give negative reactions on subsequent tests, others give positive reactions, while a comparatively few continue as suspects.

In the last few years well over a million blood tests have been run in this laboratory and have supplied a considerable amount of

data upon the efficiency of the test. When properly conducted, accurately read, and properly interpreted, this test has been found very efficient in controlling the disease in Missouri herds. Such results must be intelligently applied in handling the herds in question in order to obtain maximum results.

MANAGEMENT OF HERDS

After the blood agglutination test has been completed, all animals that have reacted to the test should be removed from the premises and either sold for slaughter or placed in strict isolation. The quarters, including barns, corrals, watering troughs, etc., should be thoroughly cleaned and properly disinfected. The negative animals, or non-reactors, may be continued on the same pastures with comparative safety, provided the herd is retested at regular intervals and all reactors removed as they are found. In a herd in which there is infection on the first test it is necessary to make retests oftener than in a herd which is free from infection on the initial test. In some herds it is necessary to retest every thirty days, but to get the best results retesting intervals should not exceed sixty or ninety days. Disease-free herds may be kept free from disease by retesting every three months, or in some cases, twice a year.

One of the greatest problems in connection with the control of Bang's disease by means of the agglutination test is the proper disposition of the animals which are classified as suspects. Facilities are not always available on the average farm for the isolation of such animals, but this would be the ideal procedure to follow. Since such is not possible in many cases, some special precautions should be taken with the suspect animals. They should be isolated at the time of calving, as it is at this period that they are most likely to spread infection and be dangerous to other animals in the herd. Maternity stalls properly cleaned and disinfected make it possible to handle such animals with a reasonable degree of safety.

IMPORTANCE OF BANG'S DISEASE

The interest in controlling Bang's disease in Missouri by means of the blood test, is growing rapidly throughout the entire state. This is no doubt due to several factors, particularly since tests have been conducted on samples from all parts of the state, and the results have shown infection from this disease to be very widespread. No large area at the present time is free from the disease nor is the infection extremely severe in any particular locality.

Since infection is widespread throughout the entire state, one can readily see the great economic importance of control measures. More and more, livestock owners are using the blood test to free their herds from disease, as they realize the many losses that result when it is present in their herds. It has been found that herds in which there is infection suffer greatly in production. At a recent meeting of the Missouri State Dairymen's Association* the following interesting figures and results were presented:

1. Bang's disease reduces milk production 22.5%.
2. Bang's disease reduces the calf crop 40%.
3. Bang's disease decreases calving efficiency by 40%.
4. Bang's disease-free herds calve every 11.5 months.
5. Bang's infected herds calve every 20 months.
6. One out of every five cows aborting will become sterile.
7. Bang's disease increases (by breeding trouble, sterility, and mastitis) the needed replacements by 30%.

When one takes these figures into consideration it is not surprising that the well informed cattle owner is anxious to free his herd from this disease and that interest in its control by means of the blood test is growing so rapidly.

Another reason for the increased interest in the blood testing program is the demand by cattle huyers from other states and territories for cattle from tested disease-free herds. It has been found that a single negative test is not conclusive evidence that a cow is free from the disease, and especially is this true when that animal originates from a herd in which there are some reactors to the test. In view of this fact buyers coming into this territory often, not only demand a negative test but insist that the cow to be purchased must come from a herd not with one negative test, but from a herd which has had three or more successive negative tests. This means that the Missouri cattle owner in order to sell on an equal basis with his competitors must meet these requirements. In some cases these requirements are not only demanded by the buyers but must be met in order to qualify for interstate shipments into other states. At present it is impossible to enter cattle in some sales rings without their meeting the requirements of the negative reaction to the blood test within a given length of time prior to the date of sale. It is hoped that all public sales will adopt a similar regulation soon, as the disease cannot be properly controlled until such a condition exists.

*Merryman, Louis McL. Paper presented before Missouri State Dairymen's Association, at the University of Missouri, October, 1936.

WHY SOME HERDS FAIL TO CLEAN UP

Although we have found the test to be very efficient in controlling the spread of Bang's disease infection there have been, in certain instances, herds which have failed to free themselves of the disease after a series of consecutive tests, removal of reactors, and proper disinfection of the premises. The number of such herds is less than one-fourth of the total number of herds that showed infection on the initial test. In other words, according to statistics, three-fourths or more of the infected herds have cleaned up and become relatively free from disease, while the remaining one-fourth or less of the same type of herd have failed to do so. This latter number of herds is a very small percentage of the total number of herds tested when one includes the negative herds along with the infected ones.

A study was made to determine the chief reason why these herds failed to become clean after reacting cattle had been removed and slaughtered, and the premises cleaned and disinfected. In a news release by the Bureau of Animal Industry, in January of this year, a report was made from data collected in nine states. In this report it was indicated that sixty-five factors could be mentioned as possible reasons for recurrences of the disease, but in twenty per cent of the reports the addition of cattle from other herds was given as the chief cause of continued herd infection. Quoting further from this news release we find the following:

"The next important factor, in order of frequency, was the virulence and high incidence of the initial infection. This was listed as the cause in 15 per cent of the reports. The presence of suspects in the herd—cattle that either showed a suspicious test or had physical symptoms of Bang's disease—was the cause of further cases in about 12 per cent of the reports. Although the second and third factors are to a large extent beyond the control of the herd owner, losses from the first factor can be reduced materially by purchasing for replacements only those animals that are from so-called "negative" herds or cattle passing the test and held away from the herd until a second negative test is obtained. The three factors are considered to be the most important causes of infection found in herds after several official tests.

"Other reported factors that have a bearing on recurrences of the disease, but to a much smaller degree, are: Poorly drained pastures and barnlots, infection from neighboring herds, dark, damp, unsanitary barns and dirt floors, watering from pools in pasture, non-reacting aborters, failure to clean and disinfect following removal of aborting animals, too long intervals between tests, failure to segregate before and after calving, failure to dispose of aborters and reactors, use of bull from infected herd, reacting animals of other classes running with herds, access to manure piles or manure spread on pastures, feeding on ground, lack of information imparted to farmers, use of same implements for manure and feed, and ensilage contaminated by barn drainings into trench silos."

As is indicated in this news release the most important factor as a cause of continued herd infection was the addition of cattle from other herds.

REPLACEMENT CATTLE

Probably the main reason for addition of new cattle to herds is the replacement problem. In herds from which several reacting animals have been removed and slaughtered replacements may be necessary in order to insure sufficient production to carry on the demands made upon that herd. Such owners have gone to other herds and bought supposedly clean cattle which later were found on retesting to be infected with the disease. If it is necessary for an owner to make replacements in his herd he should be extremely cautious in his purchases. It is best to buy replacement animals from a known disease-free herd, but if this is not possible then they should be bought subject to blood test, held in quarantine thirty to sixty days and retested before they are allowed to mingle with the main herd. From statistics gathered it is quite clearly shown that a greater percentage of infected herds would clean up on repeated tests if the owners had followed this policy of contracting for and handling newly purchased animals.

PROGRAM IN THE UNITED STATES

In a summary of the Bang's Disease Program, July 1, 1934 to May 31, 1937, conducted by the Bureau of Animal Industry in cooperation with the various states, some very interesting figures have recently been released from the Bureau of Animal Industry records. In the United States as a whole during the thirty-five months there were 17,372,884 cattle tested from 1,260,047 herds. During this period Missouri has ranked fourth out of the forty-eight states, both in the total number of cattle tested and the total number of herds tested. The 907,439 cattle tested in Missouri made up 5.22% of the total number of cattle tested in the United States. These 74,219 herds were 5.89% of the total number of herds tested. During this period approximately 28.8% of the herds in Missouri contained infection and 71.2% were negative. It is interesting to note that 66,276 head of cattle, or 7.3% reacted to the test and were removed for slaughter. This may be interpreted as meaning, on the basis of the data available, that approximately 7.3% of the cattle in Missouri are infected with Bang's disease. This percentage is in

close agreement with the percentage of infection found over the United States as a whole and conditions on Missouri farms do not appear to be materially different from those on farms in other states.

SUMMARY OF WORK IN MISSOURI BY COUNTIES

In a study of the records available in this laboratory an attempt has been made to determine the initial infection in the various counties and the amount of infection that has been found in a retest of the same herds in each county. We have assumed that the first test indicates the probable amount of infection in that territory and we have chosen to designate this as initial infection. Not all of the herds have been retested, due to various reasons, but those that have been retested have, in most cases, shown a very marked decrease in the number of reactors as compared with the initial infection found. The following table gives a summary of Bang's disease testing by counties. The percentage of reactors is considered as indicating the percentage of infection.

In Table 2, N represents non-reactor, S, suspect, and R, Reactor. Although some of the figures in this table may change almost daily, they are essentially correct for the date on which they were compiled, namely, June 1, 1937.

In Figures 1 and 2 the data in Table 2 are shown in graphic form.

REDUCTION OF BANG'S DISEASE INFECTION IN MISSOURI

As is shown by the accompanying table and maps the amount of Bang's disease in Missouri cattle during the last few years has been materially reduced by the blood testing program and elimination of reacting cattle by slaughter. On the basis of several thousand tests annually it was found by this department that approximately 15% of the cattle tested in Missouri were infected with Bang's disease. For several years this percentage of infection remained somewhat constant, but this was during the period when a limited number of tests were being conducted. When the program was put upon a much larger scale the percentage of infection was materially reduced in all parts of the state. For the thirty-five months period, July 1, 1934 to May 31, 1937, the average per cent of infection in Missouri was 7.3%. During this period the per cent of infection has not only decreased but the total number

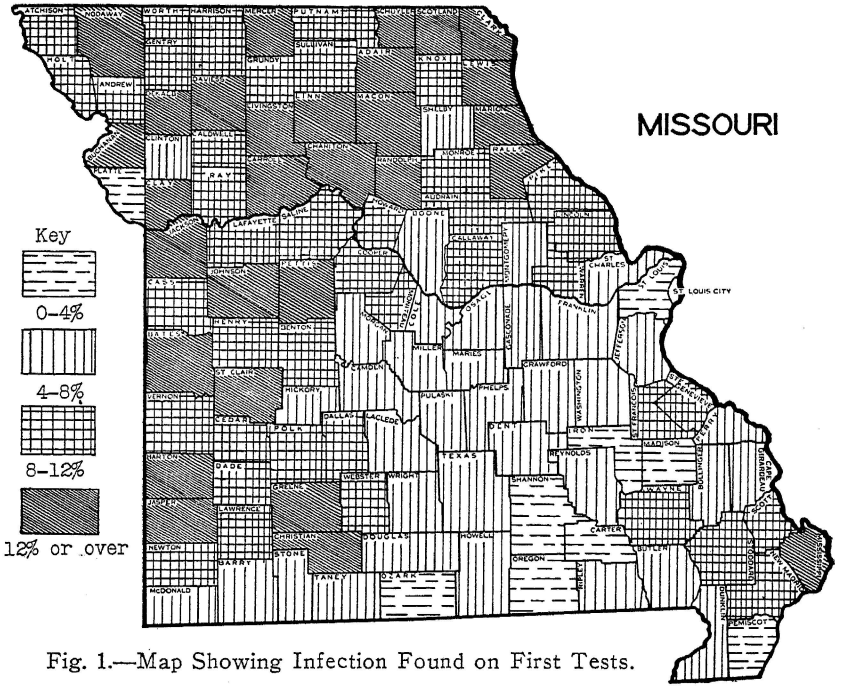

Fig. 1.—Map Showing Infection Found on First Tests.

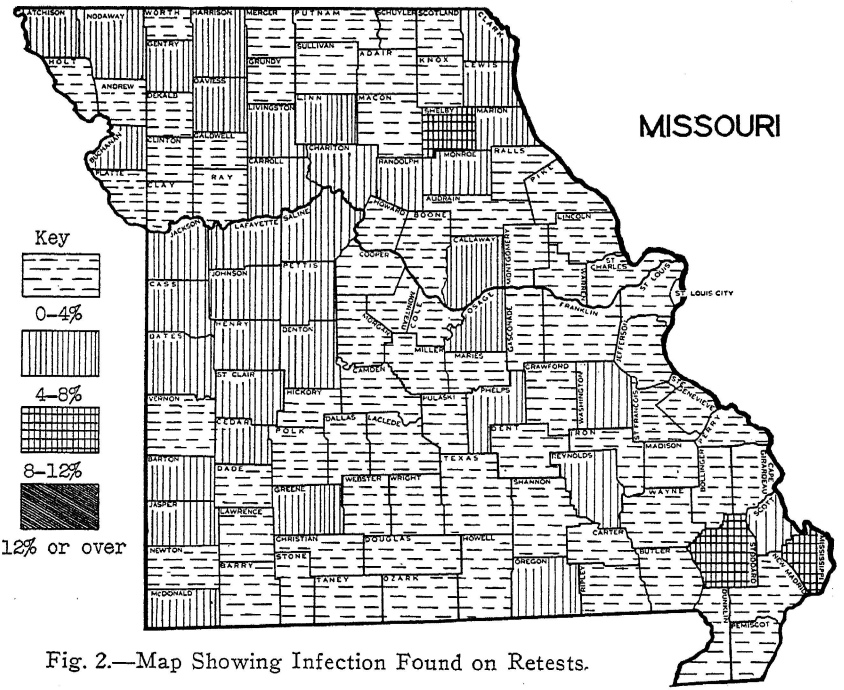

Fig. 2.—Map Showing Infection Found on Retests.

TABLE 2.—SUMMARY OF BANG'S DISEASE TESTING BY COUNTIES IN MISSOURI; OCTOBER, 1934 TO JUNE, 1937

	1st Test					Retest				
	No. Cattle	N*	S	R	% R	No. Cattle	N	S	R	% R
Adair	4151	3307	247	597	14.3	2388	2260	54	74	3.0
Andrew	3388	2877	177	334	9.8	2401	2224	94	83	3.4
Atchison	5000	4164	363	473	9.4	3934	3567	195	172	4.3
Audrain	4941	4224	309	408	8.2	2101	1895	129	77	3.6
Barry	14,853	13,471	585	797	5.3	10,483	9729	411	343	3.2
Barton	5428	4174	393	861	15.8	3622	3255	151	216	5.9
Bates	7507	5887	424	1196	15.9	6492	5759	348	385	5.9
Benton	6206	5139	383	684	11.0	5981	5450	233	298	4.9
Bollinger	4160	3831	123	206	4.9	1555	1476	25	54	3.4
Boone	6001	5199	333	469	7.8	4771	4458	167	146	3.0
Buchanan	1839	1454	124	261	14.1	2612	2373	121	118	4.5
Butler	3816	3441	123	252	6.6	1742	1671	26	45	2.5
Caldwell	4097	3581	188	328	8.0	2132	1983	95	54	2.5
Callaway	3523	3071	155	297	8.4	1908	1768	45	95	4.9
Camden	1973	1796	66	111	5.6	853	790	41	22	2.5
Cape Girardeau	4276	3891	142	243	5.6	2005	1966	19	20	0.9
Carroll	4496	3474	347	675	15.0	4112	3676	234	202	4.9
Carter	166	161	4	1	0.6	74	73	0	1	1.3
Cass	7098	5709	550	839	11.8	6637	5910	372	355	5.3
Cedar	3206	2690	171	345	10.7	1850	1666	92	92	4.9
Chariton	2846	2129	216	501	17.6	1911	1760	73	78	4.0
Christian	9020	7205	471	1344	14.9	4019	3671	189	159	3.9
Clark	2881	2235	223	423	14.6	1346	1161	84	101	7.5
Clay	964	651	141	172	17.8	975	875	63	37	3.7
Clinton	766	695	25	46	6.0	89	89	0	0	0.0
Cole	4734	4266	162	306	6.4	4107	3884	134	89	2.1
Cooper	1988	1703	72	213	10.7	2108	1972	66	70	3.3
Crawford	3611	3473	114	240	6.6	2277	2173	61	43	1.8
Dade	5910	4903	461	546	9.2	5594	5138	255	201	3.5
Dallas	8259	7174	382	703	8.5	6656	6162	317	177	2.6
Daviess	2985	2327	287	371	12.4	1537	1315	107	115	7.4
DeKalb	2427	1972	139	316	13.0	1803	1675	63	65	3.6
Dent	2089	1923	74	92	4.4	864	812	25	27	3.1
Douglas	2823	2528	128	167	5.9	1327	1235	58	34	2.5
Dunklin	1701	1556	65	80	4.7	43	43	0	0	0.0
Franklin	7776	7136	264	376	4.8	1983	1891	54	38	1.9
Gasconade	568	501	30	37	6.5	207	198	6	3	1.4
Gentry	8611	7171	486	954	11.0	6692	6107	289	296	4.4
Greene	19,725	15,763	1214	2748	13.9	18,178	16,574	771	833	4.5
Grundy	5470	4498	368	604	11.0	5549	5104	269	176	3.1
Harrison	14,622	12,041	885	1696	11.5	10,058	9235	413	410	4.0
Henry	6187	5243	432	512	8.2	5914	5403	274	237	4.0
Hickory	2590	2289	102	199	7.6	2877	2730	83	64	2.2
Holt	451	374	32	45	9.9	372	344	19	9	2.4
Howard	4169	3587	203	379	9.0	2192	2055	70	67	3.0
Howell	2592	2256	143	193	7.4	1526	1472	28	26	1.7
Iron	375	357	6	12	3.2	263	252	4	7	2.6
Jackson	11,559	9121	1029	1409	12.2	9322	8182	559	581	6.2
Jasper	10,059	7904	852	1303	12.9	11,880	10,846	542	492	4.1
Jefferson	3693	3323	156	214	5.7	2532	2344	101	87	3.4
Johnson	13,074	10,319	859	1896	14.5	6349	5732	307	310	4.8
Knox	2752	2289	206	257	9.3	2169	2005	86	78	3.5
Laclede	6929	6061	371	497	7.1	6598	6146	238	214	3.2
Lafayette	6422	5334	513	575	8.9	5853	5208	389	256	4.3
Lawrence	10,346	8831	649	866	8.3	9664	8869	454	341	3.5
Lewis	3595	2935	209	451	12.5	1482	1312	87	83	5.6
Lincoln	2751	2319	165	267	9.7	2213	2072	82	59	2.6

TABLE 2.—(Continued)

County	1st Test					Retest				
	No. Cattle	N*	S	R	% R	No. Cattle	N	S	R	% R
Linn	3866	3148	187	531	13.7	1254	1121	54	79	6.3
Livingston	5384	4307	305	772	14.3	2807	2570	107	130	4.6
McDonald	6628	5836	303	489	7.3	2176	1990	93	93	4.2
Macon	4778	3882	309	587	12.2	2087	1928	93	66	3.1
Madison	1917	1796	64	57	2.9	1218	1105	12	11	0.9
Maries	4116	3821	126	169	4.1	1857	1798	38	21	1.1
Marion	4413	3467	286	660	14.9	3488	3163	180	145	4.1
Mercer	3877	2987	319	571	14.7	2498	2387	94	17	0.6
Miller	3974	3478	207	289	7.2	2233	2048	107	78	3.4
Mississippi	1493	1207	100	186	12.4	335	297	10	28	8.3
Moniteau	4127	3580	210	337	8.1	4303	4005	164	134	3.1
Monroe	2545	2117	190	238	9.3	1727	1591	64	72	4.1
Montgomery	7520	6599	515	406	5.3	3930	3716	113	101	2.5
Morgan	6154	5371	365	418	6.7	5474	5168	178	128	2.3
New Madrid	665	540	54	71	10.6	56	53	2	1	1.7
Newton	9341	7791	668	882	9.4	7900	7359	325	216	2.7
Nodaway	5626	4397	335	894	15.8	2439	2222	116	101	4.1
Oregon	2224	2076	89	59	2.6	1781	1621	45	115	6.4
Osage	5337	5004	107	226	4.2	1127	1046	30	51	4.5
Ozark	183	180	1	2	1.0	74	74	0	0	0.0
Pemiscot	208	204	1	3	1.4	0	0	0	0	0.0
Perry	1948	1718	83	147	7.5	1239	1177	38	24	1.9
Pettis	7062	5813	389	860	12.1	5178	4743	209	226	4.3
Phelps	2545	2308	64	173	6.7	1958	1824	53	81	4.1
Pike	5723	4833	355	535	9.3	3093	2916	87	90	2.9
Platte	96	93	2	1	1.0	111	110	1	0	0.0
Polk	13,959	11,944	706	1309	9.3	13,683	12,685	539	459	3.3
Pulaski	2959	2614	114	231	7.8	1947	1823	69	55	2.8
Putnam	4276	3536	260	480	11.2	2084	1995	60	29	1.3
Ralls	3644	2927	257	460	12.6	3633	3407	138	88	2.4
Randolph	6918	5589	433	896	12.9	3212	2832	178	202	6.2
Ray	4151	3531	211	409	9.8	2859	2631	134	94	3.2
Reynolds	675	628	17	30	4.4	305	280	7	18	5.8
Ripley	1057	987	21	49	4.6	531	514	7	10	1.8
St. Charles	730	636	45	49	6.7	72	70	2	0	0.0
St. Clair	3432	2785	204	443	12.9	2151	1908	128	115	5.3
St. Francois	3240	2844	121	275	8.4	2450	2325	71	54	2.2
St. Genevieve	1162	1000	37	125	10.7	772	723	29	20	2.5
St. Louis	1187	1101	45	41	3.4	121	118	1	2	1.7
Saline	4573	3933	195	445	9.7	2610	2363	115	132	5.0
Schuyler	1286	1051	76	159	12.3	355	352	2	1	0.2
Scotland	2783	2091	284	408	14.6	2499	2248	152	99	3.9
Scott	1555	1327	98	130	8.3	618	566	26	26	4.2
Shannon	1334	1288	28	18	1.3	379	365	8	6	1.5
Shelby	1759	1598	77	84	4.7	734	647	25	62	8.4
Stoddard	2976	2605	108	263	8.8	739	631	43	65	8.7
Stone	2697	2439	106	152	5.6	1856	1759	46	51	2.7
Sullivan	13,914	11,869	729	1316	9.4	7178	6658	242	278	3.8
Taney	264	241	9	14	5.3	345	321	20	4	1.1
Texas	4295	3930	170	195	4.5	3661	3503	102	56	1.5
Vernon	5828	4751	419	658	11.2	4404	4056	200	148	3.3
Warren	687	575	46	66	9.6	388	354	20	14	3.6
Washington	661	606	10	45	6.8	344	326	4	14	4.0
Wayne	525	460	18	47	8.9	295	290	4	1	0.3
Webster	20,726	18,053	966	1707	8.2	16,243	15,163	780	300	1.8
Worth	3277	2842	148	287	8.7	700	674	17	9	1.2
Wright	8861	7965	333	563	6.3	4457	4180	134	143	3.2

of clean herds has rapidly increased, which is indicative of a marked advancement in the control of the disease in this state. This advancement in the control of the disease includes all kinds and breeds of cattle and is not confined to the dairy herds as some people have believed. The percentage of infection before the extensive control work started was approximately the same in beef herds as in dairy herds. The progress made has been very gratifying in both beef and dairy cattle.

MISSOURI PLAN OF ACCREDITATION

Several years ago the Veterinary Department, Missouri College of Agriculture, in cooperation with the State Veterinarian at Jefferson City, drew up a plan for the approval of Bang's disease-free herds. At that time several herds met all of the requirements and received certificates of accreditation.

"A Bang's disease-free approved herd under this plan is one in which no reactors to three blood tests at least six months apart have been found, covering a period of at least one year, or until one complete gestation period of the entire herd has passed."

When the Federal Program started in such large proportions the state accreditation plan was to a certain extent held in abeyance, due to the rapid progress which has been made during the last two years in freeing herds from disease. Considerable interest is now developing in the accreditation of these herds. Further information and details regarding the Missouri plan may be obtained by writing to the Veterinary Department, Missouri College of Agriculture, Columbia, Missouri.

EFFECT OF VACCINATION UPON THE BLOOD TESTING PROGRAM

The control of Bang's disease by vaccination has been recommended by some, but due to the fact that the College of Agriculture considers vaccination against Bang's disease still in the experimental stage, they have not recommended its widespread use in Missouri. At the present time several experiments are being conducted with calfhood vaccination, as it shows the most promise in giving satisfactory results. This product is still in the experimental stage and definite conclusions regarding its efficiency cannot be drawn until the work has been carried on more extensively and over a period of years. Vaccination of mature cattle definitely inter-

feres with the blood testing program, as the use of vaccine may cause animals to react to the blood agglutination test. Until further information is available, vaccine should not be used in disease-free herds.

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