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THE BOLL WEEVIL

AND

COTTON CROP OF TEXAS

W. J. CLAY
COMMISSIONER.

AUSTIN:
THE STATE PRINTING COMPANY,
1905.

DEPARTMENT OF
AGRICULTURE, INSURANCE, STATISTICS AND HISTORY
AUSTIN, TEXAS.

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A STATISTICAL STUDY
OF THE
DECREASE IN THE TEXAS COTTON CROP
DUE TO
THE MEXICAN COTTON BOLL WEEVIL
AND THE
COTTON ACREAGE OF TEXAS
1899 TO 1904 INCLUSIVE.

By ²²⁴E. DWIGHT SANDERSON
Recently State Entomologist.

The Mexican Cotton Boll Weevil Magnified 64 Times.

AUSTIN, TEXAS:
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INTRODUCTORY.

Toward mitigating the losses occasioned by the cotton boll weevil accurate statistics of the cotton crop for each county of the infested area are of the utmost importance, for the loss due to this insect is now so great that it must exercise an increasingly important influence upon the market price of cotton. A short crop means a higher price, but it not infrequently happens that the higher price is not realized by the farmer, the rise in price taking place after he has sold the bulk of the crop to parties who realize the profit. If the farmer received the price for his cotton which the market supply warranted the loss occasioned by the weevil would in many instances be largely palliated, for there is more profit in but $\frac{1}{4}$ bale per acre at 10 cents per pound, as in 0.4 bale at 6 cents. The quicker and more accurately that the actual amount of damage due to the weevil and the total product of the infested area can be forecasted each year and the statistics placed in the hands of the farmer, the more likely he is to sell his crop intelligently and to realize the most that the market will warrant. Such statistics will of course be of most value to the infested area in years of an average or short crop in other States and of less value in years of a bumper crop. These facts are of course almost axiomatic, but may well receive special consideration at the present time when the immense crop of 1904 has perhaps somewhat obscured the probable influence of the boll weevil as a factor in the amount of the cotton crop for 1905 and future years.

Past Estimates.—The first estimate of the amount of damage by the weevil was made by Mr. C. H. Tyler Townsend, then field agent of the Division of Entomology of the United States Department of Agriculture, in December, 1894. (Insect Life, Vol. VII, page 308.) He estimated that one-sixth of the cotton producing region of the State was infested, the damage in the infested region being 90 per cent and this amounting to 15 per cent of the crop of the State. This was undoubtedly quite excessive. The counties infested in 1894 and in 1899 formed but 5 per cent of the cotton acreage of the State and probably had about the same proportion in 1894. In 1899 they produced but 4 per cent of the total crop of the State.

In August, 1902, Prof. F. W. Mally, in his Report Upon the Boll Weevil, gave an estimate of the percentage of injury in each of the infested counties, making a total of 235,969 bales loss for 1902. These estimates were made before any figures could be secured upon the total yield for that year and at a season when the injury by the weevil is at its worst. Consequently it is not surprising that the actual yield of the infested counties as shown in our tables indicates rather less injury than was anticipated by Prof. Mally for that year. Mr. W. D. Hunter, in charge of the boll weevil investigations of the United States

Department of Agriculture, in January, 1903 (Farmers' Bulletin 163, U. S. Dept. Agr.), gave \$10,000,000 as a conservative estimate of the damage done in 1902, which is practically that given in Table 1.

In November, 1903, at the second Texas Cotton Convention at Dallas, Mr. Hunter estimated the injury for 1903 at about \$15,000,000. (Proceedings 2d Ann. Texas Cotton Conv. p. 74, and Farmers' Bulletin 189, p. 13.)

In December of the same year the writer made an estimate of the amount of damage done based upon a comparison of the crops of the infested and uninfested counties for 1902 and 1903 with that of 1899 as given in the bulletins of the United States Census. (Proceedings of the Society for Promotion of Agricultural Science, 1903, pp. 157-170, reprinted as Circular 8, Entomological Department, Texas Agr. Exp. Station, Apr., 1904.) Upon this basis a loss of 445,956 bales for 1902 and 500,000 for 1903 was indicated. At that time the writer became fully aware of the impossibility of making any accurate estimate of the damage done by the weevil without a knowledge of the actual acreage of each of the injured counties for each year since its infestation, with the average yield per acre prior to the advent of the weevil for each county. This is clearly shown by a comparison of the estimates in the years given below with those then made. Though the estimate for 1903 was approximately correct, that for 1902 was more than double the probable correct amount as now shown by the writer and previously by Hunter and Mally.

To determine the injury done by the weevil with any degree of accuracy it is necessary to ascertain the yield per acre for each county in the injured and uninjured area and to compare this with the yield per acre of the same counties prior to injury by the weevil. This will give the decrease of production due to the weevil in the counties known to have been injured, except as influenced by storms, floods, and insects, such as the boll worm, which factors it is almost impossible to estimate in many cases.

Thanks to the excellent system of ginners' reports now employed by the United States Census Bureau it is possible to secure the actual product of each county for each year since 1899, with the greatest accuracy possible.

From 1887 to 1895 the Commissioner of Agriculture of Texas in his annual reports gave the acreage and product of each county. For a few years the yield per acre was given, but most of them have been computed by the writer. After computing the average yield per acre for each county for each year from 1887 to 1895, the average yield per acre for the nine years for each county was found, which with the minimum and maximum yield per acre during that period is given for each county in Table 2 below. These figures formed a very accurate means of determining the actual average crop of each county prior to the advent of the weevil. It remained to secure the acreage for each county since 1899, the acreage of 1899 being given by the Twelfth United States Census and probably being the most accurate obtainable upon which to base estimates of subsequent acreage.

THE COTTON ACREAGE OF TEXAS.

Upon application to the Bureau of Statistics of the United States Department of Agriculture in 1903, we were informed that no statistics of acreage by counties were available. Other sources from whom estimates of any reliability could be secured were therefore sought. Fortunately the two leading newspapers of the State, the Dallas-Galveston News and Houston Post, have for the past few years gone to considerable expense in collecting and publishing the reports of from 300 to 500 reporters for each paper, upon the acreage, condition, and yield of cotton and other crops during each season. Through the courtesy of the management of these papers the writer was given access to their files. Each report was scrutinized, and the average acreage for each county, and the number of reporters, was tabulated as given by each paper. The railroads of the State also make frequent estimates of the acreage and probable crop of cotton along their lines to aid in preparation for its movement, and through the courtesy of the officials of the Gulf, Colorado and Santa Fe, Houston and Texas Central, Houston East and West Texas, San Antonio and Aransas Pass, Missouri, Kansas and Texas, St. Louis Southwestern and Fort Worth and Rio Grande, we were furnished with copies of reports of their agents as far as available. During 1903 and 1904 some 200 voluntary entomological observers scattered over the State reported to the writer as State Entomologist at frequent intervals upon the insect injuries of their vicinity and also upon the increase or decrease of cotton acreage, injury by weevil and probable crop. The number of observers and average report upon acreage for each county was likewise tabulated. A circular letter was then prepared and over a thousand copies sent to county assessors, postmasters and railroad agents asking their opinion upon acreage for their counties. In 1903 the State Statistical Agent of the United States Department of Agriculture, Mr. Oswald Wilson of Fort Worth, commenced recording the reports upon crops by counties and schedules were prepared by him giving the acreage for each county, and upon these, each report was recorded and arranged by counties. Through the courtesy of Mr. Wilson we were allowed to summarize these reports and tabulated the number of reports and the average report upon acreage for each county for 1903 and 1904. Among these sources of information there is but little choice as to accuracy and an estimate must be made from an average of all. The reports from all sources were therefore assembled upon a card for each county upon which was also given the product for each year as given by the census and the acreage of 1899 as a basis for subsequent acreage. The reports of the railroads mentioned above were given by stations. It was necessary to assemble these by counties and to then weight the report of each agent according to the proportion of the total crop of the county handled by his station, which was done with the aid of the tables on

Shipments of Cotton by Rail in Bulletins 19 and 28, Division of Statistics, United States Department of Agriculture. The cards thus used were ruled as shown below for Brazos county.

BRAZOS COUNTY.

First infested, 1898. First injured, 1900. 49,213 acres. 22,069 bales. 0.44 bales per acre, 1899.

Bales and bales per acre.	1900.			1901.			1902.			1903.			1904.		
	18,473	0.41		20,635	0.47		15,038	0.37		15,212	.38		20,009	.44	
Source.	No. Repts. Per ct. of 1899.		Acres.	No. Repts. Per ct. of 1900.		Acres.	No. Repts. Per ct. of 1901.		Acres.	No. Repts. Per ct. of 1902.		Acres.	No. Repts. Per ct. of 1903.		Acres.
Dallas News	2	95	.....	4	100	.....	4	95	.....	4	86	.....	2	115	.....
Houston Post	4	85	.....	3	90	.....	3	95	.....	3	80	.....	4	109	.....
Railroads			.....			.....			.....	4	80	.....			.....
Observers, Indi- viduals, etc.	1	100	.....	1	110	.....	1	100	.....	2	107	.....			.....
U. S. Aids			.....			.....			.....	2	6	.....	14	105	.....
U. S. Schedule			.....			.....			.....			62,000			.....
Combined esti- mate.	7	90	44,300	8	95	42,085	8	95	40,000	15	85	40,000	20	108	45,000

On this card the number of bales at head of column for each year is that given by the census, while the bales per acre were estimated upon the number of acres as calculated at the foot of the column for that year. In most cases the weighed average of reports from all sources was taken; that is the number of reports from each source was multiplied by the average as reported, these added and the sum divided by the total number of reports. In many cases, however, from personal knowledge of the conditions in that county, or from apparent inaccuracy of certain sources, they were disregarded in favor of uniform evidence from the majority of sources. The line giving "U. S. Aids" gives the summary of reports made to the State Statistical Agent, United States Department of Agriculture as far as they could be classified by counties. The line "U. S. Schedule" gave the estimate of acreage prepared by Mr. Wilson and used upon his schedules for making estimates, the total of which was practically the same as the Department's estimate of June, 1903. This was found in many cases to give a much larger acreage than any sources of information warranted. In such cases the highest figures reported for acreage of the county were usually used as the final estimate and often an additional acreage was added, to obviate any possibility of underestimating where there was still a large difference between the two figures. This is only for 1903 as the schedules were prepared in that year. The basis of the present acreage of the Department of Agriculture was therefore given careful consideration for each county, but this estimate of county acreages was merely for office use and not for publication. Thus in Brazos county in 1903 all sources of information would have shown a marked decrease in acreage, 15 per cent, which would have given 34,000 acres based on the estimate of 40,000 for 1902. But as the De-

partment's schedule gave 62,000 acres we made our final estimate of the acreage as 40,000 acres allowing no decrease from 1902. In other words, though our estimates for 1900, 1901 and 1902 are most probably correct for this county, and though there was undoubtedly all of 15 per cent decrease in 1903, in order not to by any means underestimate the acreage, in view of the Department's very large increase over 1899, we practically added 6000 acres. This was done in numerous instances, so that our estimates of the total acreage of the State or of groups of counties are uniformly higher than the reports warranted, though very much below the figures officially published by the Department. The total number of reports for each county as far as collected for each year was quite variable, but for the leading cotton counties was rarely under five and usually averaged between ten and fifteen.

Having illustrated the writer's method of estimating the acreage it will now be of interest to consider the acreage of the State as a whole and of the different groups of counties from year to year and to compare them with the estimates from other sources, especially those made by the United States Department of Agriculture, which are the only official figures annually published upon acreage.

Commencing with 1899 the reports of the United States Census must be taken as the official figures, for they are based upon an actual canvas of the territory and are the only published figures giving the acreage for each county. The Department of Agriculture has never published any estimates of the acreage of each county, and as far as the writer can ascertain never computed the acreage for each county in Texas until 1903, when estimates were made based upon the census figures, and were tabulated for use in making future estimates, as previously mentioned. The report of the census showed 318,000 acres more in Texas and 754,000 acres more in the United States than the estimate of the Department of Agriculture.

Our estimate for 1900 shows 97.9 per cent of the acreage of 1899 or a decrease of 146,795 acres. For this year the Department of Agriculture gave an increase of 8 per cent. In the final estimate published by the Department (Bull. 28 Div. Statistics, see Table IV.), it is stated that the estimates have been revised "to bring them into reasonable conformity with those of the United States Census." To the Department's estimate of December, 1900, of 25,034,734 acres for United States was evidently added 723,405 acres to give the 25,758,139 acres for United States as finally published, which would represent very closely the difference between the census figures and those of the Department in 1899.

TABLE I.—Acreage and Yield per Acre of Cotton and Injury by Boll Weevil in Texas, 1899 to 1904.

Year.	Counties.	First infested by weevil.	First serious injury.	Per cent of total product in 1899.	Per cent of total acreage in given year.	Average yield in bales per acre 1887-1893.	Bales.	Per acre.	Acres.	Average per acre for previous 10 years.	Per cent of acreage of last year.	Increase.		Decrease.		Total bales decrease in injured counties.	Loss by other causes.	Total bales loss due to weevil.
												Bales.	Per acre.	Bales.	Per acre.			
1899	11 of Southern Group A*	1894				.40	32,799	.27	119,421									
	1895	1895				.45	69,655	.34	231,419									
	7 of Southern Group B	1894																
	18 Injured, Total			4	5	.43	102,451	.28	350,810									
1900	Balance of State					.39	2,496,504	.38	6,609,527	39.2								
	Total					.39	2,602,018	.37	6,728,337	38.8								
	7 Southern Group B†	1899				.45	114,452	.44	257,450	11 years.								
	13 Central Groups A, B‡	1894-5 1900				.45	262,823	.26	781,718									
1901	Total 20 Injured			18	15	.45	317,775	.30	1,031,398									
	Balance of State					.38	3,120,611	.54	5,774,204	.39								
	Total					.39	3,438,386	.50	6,813,572	.385								
	7 Southern Group B	1899				.45	70,994	.27	261,480	12 years.								
1902	14 Central Groups A, B‡	1894-5 1900				.45	279,112	.34	859,818									
	Total 21 Injured			20	16	.45	350,106	.31	1,121,328									
	Balance of State					.38	2,124,000	.35	6,123,447	.40								
	Total					.39	2,502,165	.34	7,244,775	.40								

*Southern Group A except Victoria and Goliad. †Estimate of U. S. Census. ‡Groups A and B, Central, except Brazos, Comal and Caldwell. §Central Groups A and B except Brazos and Comal. ¶Galveston Storm.

1902	7 Southern Group B	1894-5 1900																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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TABLE II.—Estimate of Cotton Acreage by Counties, 1899-1904.

County.	1887-1895				1899				1900				1901				1902				1903				1904			
	First Invested	Min. Injured.	Max. Injured.	Average.	Bales.	Per acre.	Acre.		Bales.	Per acre.	Acre.		Bales.	Per acre.	Acre.	Average per acre, lbs.	Bales.	Per acre.	Acre.	Bales.	Per acre.	Acre.		Bales.	Per acre.	Acre.		
Southern Group A.																												
Alascosa	1885	10	47	31	18,552	21	18,500	4,744	25	19,000	8,447	18	9,244	45	20,000	2,082	2,082	10	18,000					2,082	10	18,000		
Bee	1891	11	70	42	14,409	33	15,800	12,817	81	17,335	5,014	31	17,335	46	17,000	2,886	2,886	13	18,000					2,886	13	18,000		
Brewer	1885	21	68	38	42,485	59	46,700	12,678	27	46,700	9,711	20	46,700	27	46,000	8,450	8,450	17	43,000					8,450	17	43,000		
Camaron	1891	11	88	35	2,424	35	2,440	658	26	2,440	500	23	2,440	23	2,400	9,823	9,823	15	12,000					9,823	15	12,000		
Duval	1894	13	54	33	17,743	41	18,630	6,651	35	19,560	8,138	31	19,560	35	19,600	6,431	6,431	15	23,000					6,431	15	23,000		
Giddard	1894	13	54	33	17,743	41	18,630	6,651	35	19,560	8,138	31	19,560	35	19,600	6,431	6,431	15	23,000					6,431	15	23,000		
Hidalgo	1894	13	54	33	17,743	41	18,630	6,651	35	19,560	8,138	31	19,560	35	19,600	6,431	6,431	15	23,000					6,431	15	23,000		
Karnes	1894	13	54	33	17,743	41	18,630	6,651	35	19,560	8,138	31	19,560	35	19,600	6,431	6,431	15	23,000					6,431	15	23,000		
Lave Oak	1894	13	54	33	17,743	41	18,630	6,651	35	19,560	8,138	31	19,560	35	19,600	6,431	6,431	15	23,000					6,431	15	23,000		
Nueces	1891	20	87	46	1,591	31	1,591	1,591	17	1,591	805	17	1,591	17	1,591	1,591	1,591	33	38,000					1,591	33	38,000		
San Patricio	1891	20	87	46	1,591	31	1,591	1,591	17	1,591	805	17	1,591	17	1,591	1,591	1,591	33	38,000					1,591	33	38,000		
Victoria	1891	20	87	46	1,591	31	1,591	1,591	17	1,591	805	17	1,591	17	1,591	1,591	1,591	33	38,000					1,591	33	38,000		
Total	1891	31	70	54	11,556	61	19,421	5,517	22	19,000	9,950	47	19,000	47	19,000	5,517	5,517	31	20,500					5,517	31	20,500		
Southern Group B.																												
Calhoun	1885	25	1	42	156,588	37	165,540	57,898	38	169,837	58,236	38	169,837	38	172,008	41	74,901	42	177,460					74,901	42	177,460		
De Witt	1895	25	1	42	156,588	37	165,540	57,898	38	169,837	58,236	38	169,837	38	172,008	41	74,901	42	177,460					74,901	42	177,460		
Guadalupe	1891	25	82	48	53,351	43	3,000	1,401	39	3,000	1,009	29	3,000	29	3,000	401	401	35	3,000					401	35	3,000		
Jackson	1891	25	82	48	53,351	43	3,000	1,401	39	3,000	1,009	29	3,000	29	3,000	401	401	35	3,000					401	35	3,000		
Matagorda	1891	25	82	48	53,351	43	3,000	1,401	39	3,000	1,009	29	3,000	29	3,000	401	401	35	3,000					401	35	3,000		
Refugio	1891	25	82	48	53,351	43	3,000	1,401	39	3,000	1,009	29	3,000	29	3,000	401	401	35	3,000					401	35	3,000		
Wilson	1891	25	82	48	53,351	43	3,000	1,401	39	3,000	1,009	29	3,000	29	3,000	401	401	35	3,000					401	35	3,000		
Total	1891	24	50	32	8,522	17	51,000	17,291	30	56,100	14,110	25	56,100	25	58,900	6,473	6,473	38	200,940					6,473	38	200,940		
Central Group A.																												
Austin	1885	40	60	47	53,925	58	51,230	18,073	30	46,110	15,494	33	46,110	33	46,110	15,494	15,494	38	40,000					15,494	38	40,000		
Brazos	1891	40	60	47	53,925	58	51,230	18,073	30	46,110	15,494	33	46,110	33	46,110	15,494	15,494	38	40,000					15,494	38	40,000		
Burleson	1891	40	60	47	53,925	58	51,230	18,073	30	46,110	15,494	33	46,110	33	46,110	15,494	15,494	38	40,000					15,494	38	40,000		
Comal	1891	40	60	47	53,925	58	51,230	18,073	30	46,110	15,494	33	46,110	33	46,110	15,494	15,494	38	40,000					15,494	38	40,000		
Fort Bend	1891	40	60	47	53,925	58	51,230	18,073	30	46,110	15,494	33	46,110	33	46,110	15,494	15,494	38	40,000					15,494	38	40,000		
Total	1891	34	83	54	8,556	32	25,199	3,069	12	22,700	9,894	45	18,000	45	23,654	16,240	16,240	41	15,400					16,240	41	15,400		
Central Group B.																												
Bastrop	1885	29	50	40	91,157	44	88,423	22,671	24	92,814	20,798	25	92,814	25	86,330	11,311	11,311	45	77,700					11,311	45	77,700		
Brazoria	1885	29	50	40	91,157	44	88,423	22,671	24	92,814	20,798	25	92,814	25	86,330	11,311	11,311	45	77,700					11,311	45	77,700		
Calwell	1885	29	50	40	91,157	44	88,423	22,671	24	92,814	20,798	25	92,814	25	86,330	11,311	11,311	45	77,700					11,311	45	77,700		
Colorado	1885	29	50	40	91,157	44	88,423	22,671	24	92,814	20,798	25	92,814	25	86,330	11,311	11,311	45	77,700					11,311	45	77,700		
Fayette	1885	29	50	40	91,157	44	88,423	22,671	24	92,814	20,798	25	92,814	25	86,330	11,311	11,311	45	77,700					11,311	45	77,700		
Gonzales	1885	29	50	40	91,157	44	88,423	22,671	24	92,814	20,798	25	92,814	25	86,330	11,311	11,311	45	77,700					11,311	45	77,700		
Lavaca	1885	29	50	40	91,157	44	88,423	22,671	24	92,814	20,798	25	92,814	25	86,330	11,311	11,311	45	77,700					11,311	45	77,700		
Total	1891	35	61	45	79,428	53	79,500	27,675	35	81,000	22,906	21	81,000	21	83,000	21,707	21,707	26	83,000					21,707	26	83,000		

Total Group B.	1898 1900	29	50	281	10,965	21	45,625	11,545	291	43,341	11,018	28	39,000	5,844	15	39,000	8,290	21	39,000
	1898 1900	29	50	281	10,965	21	45,625	11,545	291	43,341	11,018	28	39,000	5,844	15	39,000	8,290	21	39,000
	1898 1900	29	50	281	10,965	21	45,625	11,545	291	43,341	11,018	28	39,000	5,844	15	39,000	8,290	21	39,000
	1898 1900	29	50	281	10,965	21	45,625	11,545	291	43,341	11,018	28	39,000	5,844	15	39,000	8,290	21	39,000
	1898 1900	29	50	281	10,965	21	45,625	11,545	291	43,341	11,018	28	39,000	5,844	15	39,000	8,290	21	39,000
	1898 1900	29	50	281	10,965	21	45,625	11,545	291	43,341	11,018	28	39,000	5,844	15	39,000	8,290	21	39,000
	1898 1900	29	50	281	10,965	21	45,625	11,545	291	43,341	11,018	28	39,000	5,844	15	39,000	8,290	21	39,000
	1898 1900	29	50	281	10,965	21	45,625	11,545	291	43,341	11,018	28	39,000	5,844	15	39,000	8,290	21	39,000
	1898 1900	29	50	281	10,965	21	45,625	11,545	291	43,341	11,018	28	39,000	5,844	15	39,000	8,290	21	39,000
	1898 1900	29	50	281	10,965	21	45,625	11,545	291	43,341	11,018	28	39,000	5,844	15	39,000	8,290	21	39,000
Total Groups A. B.	1901 1902	25	42	43	55,754	38	131,200	51,842	35	144,230	43,647	32	137,100	41,967	34	130,245	69,212	48	148,270
	1901 1902	25	42	43	55,754	38	131,200	51,842	35	144,230	43,647	32	137,100	41,967	34	130,245	69,212	48	148,270
	1901 1902	25	42	43	55,754	38	131,200	51,842	35	144,230	43,647	32	137,100	41,967	34	130,245	69,212	48	148,270
	1901 1902	25	42	43	55,754	38	131,200	51,842	35	144,230	43,647	32	137,100	41,967	34	130,245	69,212	48	148,270
	1901 1902	25	42	43	55,754	38	131,200	51,842	35	144,230	43,647	32	137,100	41,967	34	130,245	69,212	48	148,270
	1901 1902	25	42	43	55,754	38	131,200	51,842	35	144,230	43,647	32	137,100	41,967	34	130,245	69,212	48	148,270
	1901 1902	25	42	43	55,754	38	131,200	51,842	35	144,230	43,647	32	137,100	41,967	34	130,245	69,212	48	148,270
	1901 1902	25	42	43	55,754	38	131,200	51,842	35	144,230	43,647	32	137,100	41,967	34	130,245	69,212	48	148,270
	1901 1902	25	42	43	55,754	38	131,200	51,842	35	144,230	43,647	32	137,100	41,967	34	130,245	69,212	48	148,270
	1901 1902	25	42	43	55,754	38	131,200	51,842	35	144,230	43,647	32	137,100	41,967	34	130,245	69,212	48	148,270
Central Group C.	1901 1903	20	45	34	62,158	27	72,000	20,768	40	72,000	31,043	43	72,000	33,445	46	72,000	33,445	46	72,000
	1901 1903	20	45	34	62,158	27	72,000	20,768	40	72,000	31,043	43	72,000	33,445	46	72,000	33,445	46	72,000
	1901 1903	20	45	34	62,158	27	72,000	20,768	40	72,000	31,043	43	72,000	33,445	46	72,000	33,445	46	72,000
	1901 1903	20	45	34	62,158	27	72,000	20,768	40	72,000	31,043	43	72,000	33,445	46	72,000	33,445	46	72,000
	1901 1903	20	45	34	62,158	27	72,000	20,768	40	72,000	31,043	43	72,000	33,445	46	72,000	33,445	46	72,000
	1901 1903	20	45	34	62,158	27	72,000	20,768	40	72,000	31,043	43	72,000	33,445	46	72,000	33,445	46	72,000
	1901 1903	20	45	34	62,158	27	72,000	20,768	40	72,000	31,043	43	72,000	33,445	46	72,000	33,445	46	72,000
	1901 1903	20	45	34	62,158	27	72,000	20,768	40	72,000	31,043	43	72,000	33,445	46	72,000	33,445	46	72,000
	1901 1903	20	45	34	62,158	27	72,000	20,768	40	72,000	31,043	43	72,000	33,445	46	72,000	33,445	46	72,000
	1901 1903	20	45	34	62,158	27	72,000	20,768	40	72,000	31,043	43	72,000	33,445	46	72,000	33,445	46	72,000
Total Group D.	1902 1903	21	47	32	16,894	32	10,555	16,105	32	49,550	25,746	54	47,000	13,788	29	47,000	11,838	25	47,000
	1902 1903	21	47	32	16,894	32	10,555	16,105	32	49,550	25,746	54	47,000	13,788	29	47,000	11,838	25	47,000
	1902 1903	21	47	32	16,894	32	10,555	16,105	32	49,550	25,746	54	47,000	13,788	29	47,000	11,838	25	47,000
	1902 1903	21	47	32	16,894	32	10,555	16,105	32	49,550	25,746	54	47,000	13,788	29	47,000	11,838	25	47,000
	1902 1903	21	47	32	16,894	32	10,555	16,105	32	49,550	25,746	54	47,000	13,788	29	47,000	11,838	25	47,000
	1902 1903	21	47	32	16,894	32	10,555	16,105	32	49,550	25,746	54	47,000	13,788	29	47,000	11,838	25	47,000
	1902 1903	21	47	32	16,894	32	10,555	16,105	32	49,550	25,746	54	47,000	13,788	29	47,000	11,838	25	47,000
	1902 1903	21	47	32	16,894	32	10,555	16,105	32	49,550	25,746	54	47,000	13,788	29	47,000	11,838	25	47,000
	1902 1903	21	47	32	16,894	32	10,555	16,105	32	49,550	25,746	54	47,000	13,788	29	47,000	11,838	25	47,000
	1902 1903	21	47	32	16,894	32	10,555	16,105	32	49,550	25,746	54	47,000	13,788	29	47,000	11,838	25	47,000
Central Group E.	1902 1903	26	51	35	3,951	48	397,060	146,523	34	421,200	18,774	44	422,550	109,251	27	404,085	139,350	32	35,550
	1902 1903	26	51	35	3,951	48	397,060	146,523	34	421,200	18,774	44	422,550	109,251	27	404,085	139,350	32	35,550
	1902 1903	26	51	35	3,951	48	397,060	146,523	34	421,200	18,774	44	422,550	109,251	27	404,085	139,350	32	35,550
	1902 1903	26	51	35	3,951	48	397,060	146,523	34	421,200	18,774	44	422,550	109,251	27	404,085	139,350	32	35,550
	1902 1903	26	51	35	3,951	48	397,060	146,523	34	421,200	18,774	44	422,550	109,251	27	404,085	139,350	32	35,550
	1902 1903	26	51	35	3,951	48	397,060	146,523	34	421,200	18,774	44	422,550	109,251	27	404,085	139,350	32	35,550
	1902 1903	26	51	35	3,951	48	397,060	146,523	34	421,200	18,774	44	422,550	109,251	27	404,085	139,350	32	35,550
	1902 1903	26	51	35	3,951	48	397,060	146,523	34	421,200	18,774	44	422,550	109,251	27	404,085	139,350	32	35,550
	1902 1903	26	51	35	3,951	48	397,060	146,523	34	421,200	18,774	44	422,550	109,251	27	404,085	139,350	32	35,550
	1902 1903	26	51	35	3,951	48	397,060	146,523	34	421,200	18,774	44	422,550	109,251	27	404,085	139,350	32	35,550
Total	1902 1903	21	47	32	16,894	32	10,555	16,105	32	49,550	25,746	54	47,000	13,788	29	47,000	11,838	25	47,000
	1902 1903	21	47	32	16,894	32	10,555	16,105	32	49,550	25,746	54	47,000	13,788	29	47,000	11,838	25	47,000
	1902 1903	21	47	32	16,894	32	10,555	16,105	32	49,550	25,746	54	47,000	13,788	29	47,000	11,838	25	47,000
	1902 1903	21	47	32	16,894	32	10,555	16,105	32	49,550	25,746	54	47,000	13,788	29	47,000	11,838	25	47,000
	1902 1903	21	47	32	16,894	32	10,555	16,105	32	49,550	25,746	54	47,000	13,788	29	47,000	11,838	25	47,000
	1902 1903	21	47	32	16,894	32	10,555	16,105	32	49,550	25,746	54	47,000	13,788	29	47,000	11,838	25	47,000
	1902 1903	21	47	32	16,894	32	10,555	16,105	32	49,550	25,746	54	47,000	13,788	29	47,000	11,838	25	47,000
	1902 1903	21	47	32	16,894	32	10,555	16,105	32	49,550	25,746	54	47,000	13,788	29	47,000	11,838	25	47,000
	1902 1903	21	47	32	16,894	32	10,555	16,105	32	49,550	25,746	54	47,000	13,788	29	47,000	11,838	25	47,000
	1902 1903	21	47	32	16,894	32	10,555	16,105	32	49,550	25,746	54	47,000	13,788	29	47,000	11,838	25	47,000

TABLE II.—Estimates of Cotton Acreage by Counties, 1899-1904—continued.

County.	First Infested.	First Injured.	1887-1895			1899			1900			1901			1902			1903			1904			
			Min.	Max.	Average.	Bales.	Per acre.	Acres.	Bales.	Per acre.	Acres.	Bales.	Per acre.	Acres.	Bales.	Per acre.	Acres.	Bales.	Per acre.	Acres.	Bales.	Per acre.		
Northwest Group.	Archer		49	52	25	141	.66	2,150	100	.46	2,150	92	.01	2,150	122	.05	2,580	76	.03	2,500	70	.02	3,700	
	Baylor		13	67	31	406	.15	3,050	1,857	.53	3,500	1,076	.29	3,850	2,130	.67	3,850	135	.25	4,000	206	.27	7,000	
	Childress		21	28	16	9	.23	1,062	1,280	.69	2,000	1,150	.38	3,000	2,371	.47	5,000	1,232	.25	5,000	2,129	.27	7,000	
	Clay		21	58	31	3,316	.17	18,935	7,761	.40	19,000	7,436	.40	20,000	3,364	.14	25,000	5,751	.23	25,000	9,574	.37	26,250	
	Collingsworth		11	28	21	173	.23	749	710	.28	2,500	812	.32	2,500	54	.02	25,000	1,185	.40	3,000	2,476	.18	3,450	
	Dickens		12	37	25	74	.18	400							232	.23	1,400	103	.22	2,000	750	.41	1,800	
	Donley		13	32	23	74	.21	14										103	.20	2,000	631	.18	1,000	
	Fisher		13	56	21	745	.10	6,901	3,364	.44	7,500	1,062	.13	7,900	1,800	.20	9,000	2,247	.27	10,000	4,681	.39	10,400	
	Floyd		16	43	29														1,185	.37	5,000	1,669	.13	500
	Hall		12	39	25	408	.20	1,982	1,542	.77	2,000	750	.37	2,000	550	.27	2,150	1,112	.37	3,000	569	.13	4,500	
	Hardeman		09	39	23	113	.12	891	1,186	.77	1,400	752	.61	1,400	440	.25	1,710	1,112	.37	3,000	604	.13	4,500	
	Hardin*		10	39	17	1,335	.92	1,400	1,910	.61	2,400	2,138	.61	2,400	1,715	.55	3,200	3,819	.61	1,800	3,673	.22	3,600	
	Haskell		04	46	36	83	.19	433	450	.33	1,300	1,01	.22	450	1,419	.33	3,500	3,819	.61	4,000	2,854	.28	10,000	
	Hood		15	31	23	3,674	.23	2,510	5,000	.93	28,210	1,956	.33	5,900	1,295	.16	7,500	4,152	.46	10,000	9,013	.75	12,000	
	Hood		08	55	33	7,941	.29	28,138	17,241	.61	28,210	9,889	.29	32,210	9,000	.28	32,210	16,918	.49	34,000	16,980	.43	36,720	
	Jack		13	31	24	22,431	.69	2,400	23,725	.44	31,100	5,202	.14	31,100	5,202	.14	35,510	6,931	.29	34,000	9,733	.23	42,000	
	Jones		17	36	27	4,100	.11	25,121	7,495	.26	28,000	10,411	.31	33,000	12,317	.29	47,000	17,310	.32	53,000	27,535	.38	58,000	
	Kent		23	36	27	319	.11	839	1,050	.40	250	263	.30	600	375	.30	1,000	708	.30	2,000	1,100	.08	2,000	
	Knox		10	41	22	2,135	.19	11,000	2,601	.90	2,670	2,114	.56	3,740	2,632	.50	4,000	3,611	.52	7,000	7,410	.53	14,000	
	Montague		25	46	37	15,044	.19	78,500	34,488	.43	78,500	28,454	.36	78,500	16,981	.19	84,120	30,172	.36	83,000	38,991	.43	90,000	
Motley		05	33	25	1,324	.3	3,800	2,447	.66	3,700	1,513	.37	4,000	1,967	.39	5,000	1,790	.32	5,500	4,880	.72	3,000		
Nolan		20	55	38	4,908	.16	14,500	10,511	.88	19,500	6,317	.30	20,550	7,945	.38	20,550	9,880	.41	22,650	11,389	.49	23,000		
Palo Pinto		16	50	38	17,333	.28	60,800	36,612	.66	55,000	19,511	.32	60,500	19,211	.32	63,500	29,011	.43	61,700	35,017	.49	71,570		
Parker		12	41	22	1,366	.12	7,422	4,311	.53	9,200	2,910	.26	11,000	1,190	.11	10,400	2,463	.20	12,000	8,051	.54	12,400		
Scurry		17	31	29	29	80	.21	3,311	1,788	.71	2,500	442	.16	2,750	62	.01	35,000	848	.21	4,000	1,318	.27	5,000	
Shackelford		23	43	34	3,855	.21	18,835	5,870	.21	19,800	2,781	.13	20,500	4,137	.19	21,400	4,453	.19	22,880	5,630	.20	25,000		
Stephens		14	38	23	700	.18	3,808	1,433	.43	3,800	434	.11	3,800	1,033	.25	4,000	1,033	.25	4,000	1,211	.21	5,000		
Stonewall		12	35	24	352	.12	2,944	658	.49	3,300	2,907	.58	3,800	332	.08	4,000	2,173	.33	5,000	1,402	.24	5,800		
Throckmorton		16	46	30	301	.30	1,495	2,713	.67	4,000	2,907	.58	5,000	2,894	.18	6,000	2,173	.33	6,000	2,283	.28	8,000		
Ward		11	48	30	313	.1	301							2,907	.29	1,000	1,553	.33	1,500	1,933	.28	5,000		
Wichita		16	42	27	1,410	.40	3,600	3,629	.45	4,000	4,520	.33	4,500	1,112	.20	5,500	1,942	.27	7,000	3,629	.28	10,000		
Wilbarger		20	50	37	17,536	.27	84,119	38,315	.45	85,000	30,613	.33	93,000	18,869	.20	93,000	31,713	.33	95,000	41,515	.40	101,400		
Wise		19	49	33	3,031	.21	14,310	7,140	.49	14,500	3,953	.22	17,400	2,514	.14	18,000	5,582	.28	20,000	6,531	.22	30,400		
Young		15	45	29	42,739	.22	424,001	208,232	.47	423,041	146,423	.31	478,550	120,765	.22	549,124	160,433	.32	581,135	258,885	.34	653,100		
Total West Group.																								
	Brown		11	41	30	12,013	.28	45,680	28,273	.70	40,000	8,278	.19	44,000	11,911	.23	36,000	24,151	.40	40,000	25,342	.51	42,000	
	Cullahan		17	49	33	7,716	.28	2,384	11,980	.41	28,760	6,168	.19	32,870	7,979	.23	34,510	12,484	.34	36,240	12,325	.29	41,000	

* Should have been in Eastern Group, but was unnoticed until all totals were made, and amount is too small to influence averages or yield per acre. † Should have been in Western Group, same as above.

Coke	1903	15	39	25	1,345	20	6,694	4,820	62	7,000	1,794	.18	9,900	2,402	26	11,400	3,471	26	13,000	4,203	29	14,300
Coleman	1903	12	41	27	8,089	22	36,291	19,371	53	62,000	7,681	.20	41,500	9,250	21	43,000	20,611	26	44,000	22,549	36	51,500
Comanche	1903	12	41	27	8,089	22	36,291	19,371	53	62,000	7,681	.20	41,500	9,250	21	43,000	20,611	26	44,000	22,549	36	51,500
Concho	1903	09	35	20	23,737	07	591	47,777	27	610	23,907	.18	117,120	34,809	31	111,300	42,848	36	117,000	46,143	43	126,400
Deaf Smith*	1903	14	36	36	15,011	27	57,305	38,104	61	62,000	25,473	.38	67,000	28,272	39	72,387	88,136	45	72,300	27,772	37	7,500
Eastland	1903	15	37	36	21,211	27	57,305	38,104	61	62,000	25,473	.38	67,000	28,272	39	72,387	88,136	45	72,300	27,772	37	7,500
Erath	1903	15	37	36	21,211	27	57,305	38,104	61	62,000	25,473	.38	67,000	28,272	39	72,387	88,136	45	72,300	27,772	37	7,500
Howard	1903	18	50	27	3,104	35	8,769	6,674	71	91,000	29,628	.45	1,000	324	35	89,100	40,210	49	94,000	52,471	54	96,700
Johnson	1903	24	57	40	3,104	35	8,769	6,674	71	91,000	29,628	.45	1,000	324	35	89,100	40,210	49	94,000	52,471	54	96,700
Mauldin	1903	14	36	36	15,011	27	57,305	38,104	61	62,000	25,473	.38	67,000	28,272	39	72,387	88,136	45	72,300	27,772	37	7,500
Mason	1903	14	36	36	15,011	27	57,305	38,104	61	62,000	25,473	.38	67,000	28,272	39	72,387	88,136	45	72,300	27,772	37	7,500
Menard	1903	37	42	29	4,879	22	31,054	2,710	62	4,310	5,002	.48	12,270	7,089	26	13,650	10,487	29	14,000	11,622	29	28,700
Mills	1903	08	42	29	4,879	22	31,054	2,710	62	4,310	5,002	.48	12,270	7,089	26	13,650	10,487	29	14,000	11,622	29	28,700
Runnells	1903	14	36	36	15,011	27	57,305	38,104	61	62,000	25,473	.38	67,000	28,272	39	72,387	88,136	45	72,300	27,772	37	7,500
San Saba	1903	16	53	34	1,411	11	12,601	4,770	36	30,700	4,834	.43	36,000	10,163	28	36,000	15,531	32	40,500	22,866	32	10,000
Somervell	1904	14	36	36	15,011	27	57,305	38,104	61	62,000	25,473	.38	67,000	28,272	39	72,387	88,136	45	72,300	27,772	37	7,500
Taylor	1903	13	47	40	6,520	23	27,907	10,389	33	329	4,834	.43	36,000	10,163	28	36,000	15,531	32	40,500	22,866	32	10,000
Town Green	1903	13	47	40	6,520	23	27,907	10,389	33	329	4,834	.43	36,000	10,163	28	36,000	15,531	32	40,500	22,866	32	10,000
Reeves	1903	13	47	40	6,520	23	27,907	10,389	33	329	4,834	.43	36,000	10,163	28	36,000	15,531	32	40,500	22,866	32	10,000
Total	1903	16	50	32	145,514	25	554,731	290,149	53	563,524	159,832	.25	637,820	208,875	32	617,150	303,437	44	693,280	815,575	41	828,430
Southwest Group.	1903	16	50	32	145,514	25	554,731	290,149	53	563,524	159,832	.25	637,820	208,875	32	617,150	303,437	44	693,280	815,575	41	828,430
Bandera	1903	40	47	47	1,206	29	4,086	8,402	70	4,200	2,512	.51	4,720	1,704	32	5,170	5,075	85	5,430	2,873	44	6,500
Frio	1903	10	50	27	2,500	19	13,761	7,917	18	15,140	4,464	.28	15,400	2,410	14	16,700	19,225	81	20,000	3,618	17	21,000
Gillespie	1903	10	48	38	6,383	46	13,885	12,956	81	15,870	8,216	.49	16,640	6,713	38	17,500	15,403	81	19,000	13,916	64	21,700
Kerr	1903	10	48	38	6,383	46	13,885	12,956	81	15,870	8,216	.49	16,640	6,713	38	17,500	15,403	81	19,000	13,916	64	21,700
Kimble	1903	10	48	38	6,383	46	13,885	12,956	81	15,870	8,216	.49	16,640	6,713	38	17,500	15,403	81	19,000	13,916	64	21,700
La Salle	1903	10	48	38	6,383	46	13,885	12,956	81	15,870	8,216	.49	16,640	6,713	38	17,500	15,403	81	19,000	13,916	64	21,700
Llano	1903	10	48	38	6,383	46	13,885	12,956	81	15,870	8,216	.49	16,640	6,713	38	17,500	15,403	81	19,000	13,916	64	21,700
McMullen	1903	10	48	38	6,383	46	13,885	12,956	81	15,870	8,216	.49	16,640	6,713	38	17,500	15,403	81	19,000	13,916	64	21,700
Medina	1903	10	48	38	6,383	46	13,885	12,956	81	15,870	8,216	.49	16,640	6,713	38	17,500	15,403	81	19,000	13,916	64	21,700
Uvalde	1903	10	48	38	6,383	46	13,885	12,956	81	15,870	8,216	.49	16,640	6,713	38	17,500	15,403	81	19,000	13,916	64	21,700
Total	1903	17	52	32	18,955	27	68,653	45,774	71	64,470	27,655	.34	81,400	21,002	23	90,300	69,487	67	103,570	38,322	33	116,840
Eastern Group.	1903	17	52	32	18,955	27	68,653	45,774	71	64,470	27,655	.34	81,400	21,002	23	90,300	69,487	67	103,570	38,322	33	116,840
Angelina	1903	25	48	42	3,838	31	12,045	4,519	33	13,710	4,600	.34	13,610	6,718	53	12,670	2,883	35	10,130	1,570	15	10,130
Cherokee	1903	21	47	34	15,300	28	53,185	20,516	35	58,570	14,545	.33	63,200	2,612	38	56,400	16,433	27	65,000	2,600	23	66,000
Gregg	1903	19	40	28	6,134	32	18,451	7,810	31	22,715	8,513	.35	23,100	8,513	35	23,100	7,911	31	25,000	11,458	40	29,000
Harrison	1903	10	48	38	6,383	46	13,885	12,956	81	15,870	8,216	.49	16,640	6,713	38	17,500	15,403	81	19,000	13,916	64	21,700
Jasper	1903	28	46	39	1,822	32	5,570	2,412	42	5,570	2,412	.52	5,570	3,107	26	6,000	2,218	27	80,000	28,960	31	91,000
Nacogdoches	1903	28	46	39	1,822	32	5,570	2,412	42	5,570	2,412	.52	5,570	3,107	26	6,000	2,218	27	80,000	28,960	31	91,000
Newton	1903	25	46	35	10,041	29	47,378	21,046	44	49,725	15,409	.28	54,700	19,165	32	52,000	16,140	32	49,400	14,174	25	50,900
Panola	1903	25	46	35	10,041	29	47,378	21,046	44	49,725	15,409	.28	54,700	19,165	32	52,000	16,140	32	49,400	14,174	25	50,900
Rusk	1903	25	46	35	10,041	29	47,378	21,046	44	49,725	15,409	.28	54,700	19,165	32	52,000	16,140	32	49,400	14,174	25	50,900
Sabine	1903	27	46	37	4,262	31	57,561	17,823	31	57,000	13,472	.29	57,000	15,489	29	57,000	18,108	33	57,000	25,803	38	60,000
San Augustine	1903	27	46	37	4,262	31	57,561	17,823	31	57,000	13,472	.29	57,000	15,489	29	57,000	18,108	33	57,000	25,803	38	60,000
Shelby	1903	23	46	37	4,262	31	57,561	17,823	31	57,000	13,472	.29	57,000	15,489	29	57,000	18,108	33	57,000	25,803	38	60,000
Smith	1903	21	48	33	2,878	33	8,156	18,210	47	38,100	4,718	.38	38,100	20,913	55	39,000	20,779	52	40,100	25,952	61	42,000
Total	1903	25	49	36	154,337	31	490,293	204,142	40	517,540	157,113	.29	537,940	198,824	37	530,960	172,767	32	532,340	211,801	37	565,330

* Should have been in Northwest Group, same as preceding.

TABLE II.—Estimates of Cotton Acreage by Counties, 1899-1904—Continued.

County.	First Invested.	First Injured.	1887-1895			1899			1900			1901			1902			Average per acre, 1899-1904.	1903			1904		
			Maxi. num.	Average.	Min.	Bales.	Per acre.	Acre.	Bales.	Per acre.	Acre.	Bales.	Per acre.	Acre.	Bales.	Per acre.	Acre.		Bales.	Per acre.	Acre.	Bales.	Per acre.	Acre.
Northeastern																								
Bowie	1904	23	88	44	41,100	21,317	45	47,320	18,756	30	54,430	17,820	31	57,150	20,307	34	60,000		22,123	35	60,000	22,123	35	60,000
Clamp	1904	19	46	29	22,445	12,364	50	22,450	8,417	37	24,400	9,916	46	21,300	6,792	34	20,000		10,400	52	20,000	10,400	52	20,000
Cass	1901	20	23	28	52,219	27,400	40	52,240	19,714	36	54,800	19,277	43	49,350	19,347	43	49,350		22,456	44	49,350	22,456	44	49,350
Collin	1901	33	52	43	119,451	70,682	66	107,500	60,010	46	124,000	47,014	36	120,000	42,919	51	122,000		81,211	67	122,000	81,211	67	122,000
Cooke	1901	39	47	36	51,523	18,751	31	55,000	10,501	30	61,800	11,012	48	91,000	20,813	86	16,000		21,324	49	16,000	21,324	49	16,000
Dallas	1903	31	70	44	42,068	20,318	71	83,800	40,818	42	95,700	46,502	51	91,000	53,189	58	51,000		30,473	56	51,000	30,473	56	51,000
Delta	1901	20	40	44	41,012	20,318	71	51,500	31,471	55	54,000	26,246	51	71,000	16,901	32	51,000		12,254	61	71,000	12,254	61	71,000
Denton	1901	14	54	36	24,065	13,042	49	57,000	24,180	31	71,000	24,311	34	133,130	35,383	49	71,000		85,945	55	71,000	85,945	55	71,000
Fannin	1901	26	59	45	20,381	10,617	48	148,000	84,390	51	161,130	70,540	43	20,540	48,473	31	155,000		9,840	45	155,000	9,840	45	155,000
Franklin	1901	20	49	35	18,522	9,870	55	11,000	7,054	32	21,600	8,222	40	20,540	9,231	43	21,200		21,200	43	21,200	21,200	43	21,200
Grayson	1901	31	67	45	11,077	5,330	46	102,600	47,450	55	117,300	54,087	43	123,200	59,632	48	123,200		82,521	43	123,200	82,521	43	123,200
Hopkins	1901	16	48	35	61,183	48,918	73	121,000	30,498	41	73,000	31,917	45	77,000	32,970	42	76,000		41,911	52	76,000	41,911	52	76,000
Hunt	1903	15	77	42	50,317	24,532	73	121,000	64,545	44	122,000	49,713	37	132,000	52,593	40	134,000		68,005	44	134,000	68,005	44	134,000
Lamar		22	56	42	43,133	24,415	34	16,300	56,177	38	142,000	59,249	40	148,000	47,358	31	150,000		7,216	42	150,000	7,216	42	150,000
Marion		22	40	27	3,880	1,621	33	16,300	8,479	30	16,300	5,889	38	15,500	5,410	35	15,000		9,815	43	15,000	9,815	43	15,000
Morris	1901	12	57	37	21,000	10,045	38	23,500	8,479	30	18,000	9,332	44	21,000	9,210	45	20,100		6,453	46	20,100	6,453	46	20,100
Rains		28	40	40	14,562	6,707	39	15,500	5,219	20	18,000	5,316	35	20,500	4,301	21	20,500		38,224	43	20,500	38,224	43	20,500
Red River	1901	31	56	48	88,510	47,800	51	87,000	33,351	31	88,200	31,284	35	87,000	29,815	38	88,000		37,000	43	88,000	37,000	43	88,000
Rockwall	1901	19	40	37	32,803	16,302	43	32,800	12,331	31	38,200	12,004	35	30,000	19,311	42	37,000		22,417	45	37,000	22,417	45	37,000
Tarrant	1901	21	53	35	44,528	20,848	53	42,300	21,232	46	46,300	21,940	47	46,500	32,158	44	50,000		37,800	45	50,000	37,800	45	50,000
Titus	1901	21	53	35	21,735	10,537	55	28,000	12,757	39	32,000	13,148	39	33,000	15,759	47	33,000		16,459	41	33,000	16,459	41	33,000
Upshur	1904	22	41	33	41,849	21,387	47	44,000	21,315	37	64,200	19,083	43	40,200	14,882	31	46,200		21,028	47	46,200	21,028	47	46,200
Van Zandt	1903	23	54	34	63,982	37,781	58	64,000	31,486	31	64,200	35,714	58	60,800	22,658	35	59,700		84,182	56	59,700	84,182	56	59,700
Wood	1904	19	67	41	41,111	25,367	52	48,500	14,752	27	53,350	26,047	48	53,340	15,094	31	54,700		21,746	53	54,700	21,746	53	54,700
Total		23	56	39	1,317,210	408,240	61	1,482,220	608,434	46	1,636,240	451,637	40	1,611,090	659,730	41	1,632,685		904,324	54	1,632,685	904,324	54	1,632,685

TABLE III.—Summary of Acreage, Product and Product Per Acre by Groups of Counties, 1899-1904.

Groups of Counties.	Average bales per acre 1887-1895	1899		1900		1901		Average per acre for 18 years.	1902		1903		1904	
		Bales.	Per acre.	Acre.	Bales.	Per acre.	Acre.		Bales.	Per acre.	Bales.	Per acre.	Bales.	Per acre.
Southern Group A (12).....	.40	52,100	.37	153,588	98,908	.60	105,500	5,800	58,269	.86	172,080	74,101	39,101	.20
Southern Group B (7).....	.45	63,465	.54	231,419	114,462	.44	277,640	70,904	63,471	.25	200,940	46,445	50,334	.22
Central Groups A and B (16).....	.45	491,509	.50	983,819	281,183	.31	916,018	308,118	298,354	.28	833,310	207,446	272,457	.31
Central Group C (19).....	.42	575,333	.41	1,391,357	611,833	.47	1,300,165	173,240	431,893	.23	1,392,170	283,115	412,221	.33
Central Group D (7).....	.41	164,238	.43	339,182	222,419	.56	337,040	14,520	18,741	.41	422,510	109,251	139,374	.32
Central Group E (10).....	.37	277,340	.37	739,115	416,865	.61	687,354	250,285	191,981	.38	750,170	348,238	421,006	.53
Eastern (13).....	.36	174,337	.31	410,203	204,112	.40	517,510	174,143	101,984	.37	582,310	172,717	211,801	.37
Northeastern (21).....	.34	52,266	.37	151,210	90,830	.61	148,220	68,143	18,824	.40	1,614,910	330,799	904,819	.54
Northeastern (35).....	.24	92,734	.22	435,501	248,333	.47	433,011	140,420	130,765	.32	514,125	190,433	258,855	.39
Western (22).....	.32	117,514	.24	551,731	291,149	.53	573,321	187,879	208,875	.32	617,150	391,037	315,815	.41
Southwestern (10).....	.32	18,936	.27	68,453	46,774	.71	61,440	21,465	21,002	.23	93,300	69,187	38,333	.33
Far Western (14).....											17,000		6,725

TABLE V.

COMPARISON OF ESTIMATES IN ACREAGE IN PERCENTAGE OF LAST YEAR.

Year.	Galveston-Dallas News.	Houston Post.	Ft. W. & R. G. R. R.	Writer's.	U. S. Dept. of Agriculture.		
					State Agent.	Planted.	Picked.†
1900	97.2	93	89.14	97.9		108	(108)
1901	107.1		128.52	106.3		110	(106.6)
1902	98.1	Slight decrease.		100.		103	(99.8)
1903	91.4	105	125 H. & T. C. R. R.	99.8	94. *	101.5	[103.9]
1904	109.32		105	105	105.3*	107.1	[105.5]

* Average of all reports coming to State Statistical Agent.

† Computed by writer as shown in Table IV.

For Texas there was added to the estimate of December, 1900, of acreage picked 137,915 acres in making the final estimate of 7,178,915, which represents 2 per cent of the 8 per cent increase. Without this addition, which would be the December, 1900, estimate of 7,041,000 acres, the Department would have shown an increase of but 1.1 per cent over the acreage of the census for 1899, though 6 per cent over its own estimate for 1899. These final estimates of the Department were not published, however, until June, 1904.

From a careful study of all the reports available we fail to find any reason for estimating an increased acreage in Texas in 1900. In addition to the reports of the News and Post, the writer has used in his estimate for this year reports from all agents of the Missouri, Kansas and Texas Railroad, Cotton Belt and Fort Worth and Rio Grande Railroad. The report of the latter road shows a marked decrease for Northwest Texas and both of the papers agree in a decided decrease. During the summer of 1899 the Brazos valley suffered from two unparalleled floods, which, according to investigation of the Department of Agriculture (Circular 10 Div. Statistics), damaged 339,000 acres of cotton. Undoubtedly a large portion of this acreage was unplanted in 1900 and our estimate shows a decrease of 177,894 acres in Central Groups A, B, C, and E in 1900. In addition the Northeastern—the largest—Northwestern and Southwestern groups showed a decrease while the increase in the remainder of the State amounted to but 76,241 acres. A difference of 365,343 acres arises between our estimates and those of the Department for 1900.

In 1901 we estimate an increase of 6.3 per cent over 1900, being but 3-10 of one per cent less than that given for the Department in its final acreage picked. It may be well to here call attention to the difference in the estimates of the Department of Agriculture given out in June and December and the final estimate. The June estimate is of acres planted and is based on schedules returned the last week in May. It gives the percentage of the area planted the previous year for each State and the United States and an estimate of the total acres

for the United States. In 1901 only was an estimate published for each State, and the June estimate of the previous year given in acres. (See Table IV.) In December an estimate has usually been published of the number of abandoned acres, the percentage abandoned of acres planted, and the number of acres picked and to be picked. This was given by States in 1900, but since then only for the total United States. The final estimates of acreage for 1899 to 1902 were published in June, 1904, and though no statement is so made, doubtless represent the acreage picked, as they are uniformly less than the June estimates, except for 1900 accounted for above. Since 1902 no final estimates have been published and the final acreage picked in Texas can only be estimated for Texas as in Table IV, by assuming the same percentage abandoned in it as for the total United States. The difference in these estimates is important in any statistics dealing with the yield per acre of the cotton crop. For instance the Manual of Statistics and Stock Exchange Handbook for 1905 gives the acreage as shown in Table IV, crediting it to the estimates of the United States Department of Agriculture. Evidently the June estimates were used and those for Texas for 1902, 1903, and 1904 somewhat modified. If these figures based on the Department's June estimate are used the yield per acre will be much smaller than that later published by the Department, and indeed than should be fairly used. The reports from which the writer's estimates are made were usually made the second week in June, though some later, even into July, except in 1903 and 1904, in which years the reports of the aids of the State Statistical Agent of the Department of Agriculture made May 25 were also used. Our estimates should, therefore, be somewhat less than those of June by the Department, and might be slightly more than its December estimate, but are found to be lower than the latter in 1900 and 1903 and closely approximating the final estimate (line 7, Table IV) of increased acreage over the final estimate of the previous year as computed in Table IV. In 1901 an increase was shown in all groups of counties except Central Group AB, which was seriously injured by the Galveston storm and boll weevil in 1900.

The total acreage for 1902 is estimated as the same as that for 1901. Southern Groups A and B, Central Group E, the Northwestern and Southwestern counties, showed some increase, while the balance of the State showed an equal decrease. The June estimate of the Department gives an increase of 3 per cent over 1901. In the June Crop Reporter for 1902 it is stated that the acreage estimated then for the United States was based upon that of 1901 plus 418,000 acres added to make it better agree with the census report (published in 1902). Of the discrepancy between the acreage of the Census and Department in 1899, the Texas acreage comprised 42 per cent. If this 418,000 acres added to 1901 before estimating 1902 were evenly distributed between the States according to the actual discrepancy of 1899, then 175,560 acres would have been added to Texas, which would represent 2.3 per cent of the increase estimated for that year, leaving the increase at 0.7 per cent, but little above that of the writer. The final estimate

of acreage for this year as given by the Department in 1904 was but 99.8 per cent of 1901, practically the same as our estimate.

The acreage continued to remain practically the same in 1903, being 99.8 per cent of 1902. The summer of 1902 witnessed another serious flood of the Brazos and an increased area injured by the boll weevil, which resulted in a continuance of the decrease of acreage in the central counties. The Central groups and Southern Group B showed a decrease of 4.3 per cent from 1902, while the balance of the State showed an increase of 2.5 per cent. In addition to the News and Post, reports from the Houston East and West Texas Railroad, Houston and Texas Central Railroad and Fort Worth and Rio Grande Railroad, were consulted, reports being given from each agent of these roads. The average of 584 reports received by the State Statistical Agent of the United States Department of Agriculture from railroads, oil mills, and aids, was practically 94 per cent of the 1902 acreage. No final report has yet been made by the Department.

Assuming the abandoned acreage to have been the same as for the United States, the picked acreage would have been 3.9 per cent greater than the final acreage of 1902 (See Table IV, line 7), but probably the abandoned acreage in Texas was above the average, and it is possible that the final figures of the Department will show but little increase over the acreage picked in 1902.

The high prices of the fall of 1903 induced a considerable increase of acreage in 1904 in many parts of the State, making a total of 360,760 acres or 5 per cent above that of 1903. Central Groups C and D which had been very seriously injured by the boll weevil and boll worm in 1903 decreased their acreage 2.2 per cent. The remainder of the State increased; Central Group AB, 2.4 per cent, Southern Group B about the same, the Southwestern, Southern A, Eastern and Northwestern a total of 4.6 per cent, while the Northwestern and Western increased 16 per cent over 1903. The June estimate of the Department of Agriculture gave an increase of 7.1 per cent. If the per cent of the planted acreage abandoned in Texas in 1903 and 1904 be considered the same as for the total United States, then the picked acreage for 1904, computed upon this basis, would be but 5.5 per cent greater than the picked acreage so computed for 1903. Our estimate agrees almost exactly with the average of the reports made to the State Statistical Agent, which was 5.3 per cent increase. This includes, however, reports not arranged by counties from oil mills and railroads and recognized no decrease in any section of the State, where we have indicated a slight decrease in Central Groups C and D, almost exactly amounting to the difference in the two estimates of 0.3 per cent. Our estimates included reports from all agents of Gulf, Colorado and Santa Fe Railroad, Fort Worth and Rio Grande Railroad and estimate of Houston and Texas Central Railroad.

Comparing the total acreage of 1904 with that given by the census for 1899, there is an increase of 9 per cent for the State. This statement is, however, quite misleading. The northwestern and western counties increased 51 per cent in this time and all of the counties un-

injured by the boll weevil in 1903 (140) increased 23 per cent, while the 40 counties injured by the boll weevil in 1903, in 1904 had decreased over 7 per cent from 1899 and comprised 41 per cent of the total acreage of the State.

Against this the June, 1904, estimate of the Department of Agriculture would show an increase of 28 per cent over 1899 and the computed picked acreage for 1904 would be an increase of 22 per cent over 1899. The June estimate of the Department for 1904 is 1,085,529 acres more than that of the writer and the computed picked acreage based upon this is 625,736 acres more. It would seem that the Department's June estimate is probably 700,000 or 800,000 acres too large, and that the acreage picked computed on the basis of the June estimate and percentage abandoned is at least 500,000 acres too large since June, 1903. Undoubtedly this is to be mostly accounted for by a failure to recognize the decreased acreage of the counties badly injured by the boll weevil and floods in Central Texas, as well as to a lack of sufficiently careful analysis of reported increases from different parts of the State.

Several considerations support this view that the Texas acreage has been heretofore overestimated. A brief glance at the development of the acreage in Texas for the past 25 years as compared with the rest of the cotton belt may not be inopportune. From 1879 to 1889 the cotton acreage of Texas increased 80.61 per cent, while in the States east of the Mississippi River and Louisiana it increased an average of 46 per cent. From 1889 to 1899 the Texas acreage of cotton increased 77 per cent, practically the same as the previous decade. The Twelfth Census shows a total decrease of "improved" farm land in Texas due to a difference of classification, but if we assume that the proportion of "improved" farm land to the total farm area was the same for the previous censuses, it would seem that the increase of cotton acreage had almost exactly equalled the percentage of increase of "improved" farm land, or in other words, that the increase of acreage in cotton was due to the opening to settlement of new farms. From 1889 to 1895 the Texas acreage increased 48 per cent while the rest of the cotton States declined 11.6 per cent. From 1895 to 1899 Texas increased 14 per cent, while the rest of the cotton States increased 16.8 per cent, but not including Indian Territory and Oklahoma, they showed 14 per cent increase, the same as Texas. The cotton States, exclusive of Texas, Oklahoma and Indian Territory, decreased their cotton acreage 1.9 per cent from 1889 to 1899 according to the estimates of the United States Department of Agriculture, whereas the census gives an increase of slightly less than 2 per cent. In 1899 Texas had 35.6 per cent of her improved farm land in cotton, or 45.7 per cent of all crop acreage. At the same time practically the same ratio maintained in the largest cotton States of Alabama, Georgia, Mississippi and South Carolina. Thus in 1899 Texas had been increasing her cotton acreage at the same rate as the balance of the cotton belt for five years and had practically the same proportion of her farm acreage in cotton. From 1899 to 1904 the Department estimates would show an increase of 44 per cent in the acreage for the cotton belt exclusive of Texas, and 22 to 28 per cent for Texas. We estimate the increase for Texas at 9 per cent. Since 1899

Texas has been subject to many conditions affecting the cotton industry which have either been unknown or very much less important in other cotton States. During this time the press of the State and her agricultural leaders have night and day preached "diversification." That this has been heeded all Texans are aware. Trucking has become an increasingly important industry all through eastern, central and southern Texas. East Texas has seen a marvelous development of the fruit industry. The cotton acreage in the coast counties has undoubtedly been diminished by the rice and oil industries. An unprecedented flood of the Brazos in 1899, another in 1902, and the terrible storm of September, 1900, all tended to diminish the cotton acreage in some of the most productive counties. In addition to all these factors making for the reduction of cotton acreage, the boll weevil has spread steadily north and eastward until it now injures fully half the acreage of the State and destroys practically one-half the crop in this territory. It is certainly unreasonable to suppose that, in the face of a constantly diminishing yield per acre, planters in the injured district will continue to increase their acreage, though this has undoubtedly taken place to some extent in single seasons.

Notwithstanding these facts the counties uninjured by the boll weevil have increased 23 per cent from 1899 against 14 per cent from 1895 to 1899, while the northwestern and western counties now containing 19 per cent of the total acreage of the State have increased 51 per cent, a much greater rate of increase than that of the State for either the two previous decades, and undoubtedly coincident with the settling of new land as in the past. The average increase for the State is best shown by the thirty-seven northeastern and eastern counties, which produce 35 per cent of the crop of the State, which have been practically unaffected by the boll weevil up to 1904, and which show an increase of 10 per cent over 1899 in 1904.

In making these estimates the writer has been impressed with the fact that by no means as careful studies and statistics concerning the cotton acreage have been made as for the cotton product. The final reports upon the cotton crop as secured from the ginneries by the census approximate the total yield as nearly as possible to do so. But the acreage is determined but once in ten years, and all acreages published for other years are necessarily but "estimates." Inasmuch as all estimates of the size of the crop of a given year, and the consequent market prices, must be based upon the acreage, it would seem that if some means could be devised whereby the acreage could be determined more accurately it would be of the greatest advantage to all interested in cotton. This was formerly done by means of reports upon acreage from each county made to the Texas Commissioner of Agriculture based upon an actual canvass of the acreage by the county assessors, as published for the years 1887 to 1895. Only by some such well-organized system will accurate reports of the cotton acreage be secured. That such reports of the acreage of this and other crops would be of the utmost value will hardly be questioned. Thousands of dollars are annually spent by brokers of staple crops to secure exactly this information. At the present time (July, 1905) there is considerable comment by brokers in the daily press that crop reports by the

State or National governments are unnecessary, as their information is not relied upon and brokers maintain their own organizations at much expense to secure crop estimates. But if crop reports are secured only by private parties, the market will be influenced by them and the farmer will be at the mercy of the brokers. Furthermore, it has been demonstrated that in most years the government crop reports more nearly approximate the truth than any estimates secured by private parties. Correct crop reports and estimates by the government, State or National, enable the farmer to sell his crops to as good advantage as the broker may buy. Hence what is needed in the farmer's interest are better crop reports and better means for securing information, so that on all speculative crops the estimates may approach the actual conditions with the greatest possible accuracy. If the present discussion of the acreage of Texas, open to much error as the writer is well aware, owing to the sources from which the estimates were made, serves to bring out the necessity for more careful statistics for every county in Texas, his work will have accomplished much of its object.

LOSSES DUE TO THE BOLL WEEVIL.

In order to estimate the amount of loss due to the boll weevil from year to year, as well as for a proper discussion of the acreage, it is necessary to group the counties, basing these groups upon the spread of infestation by the weevil. These groups are determined by (1) the year in which the counties first became infested, (2) the year in which counties first became injured, and (3) arbitrary geographical groups of uninfested or but slightly infested counties in which no appreciable injury has yet occurred. The spread of the weevil over the State up to August, 1904, as given by the United States Department of Agriculture and records of the State Entomologist, is shown in figure 1, and the groups of counties based upon this in figure 2. Of the southern counties infested by 1895 two groups are considered. The twelve of Southern Group A were somewhat injured in 1899, but since then have yielded practically a normal crop each season until 1904, while those of Southern Group B, seven counties, have shown an increasing loss. Central Groups A and B were considered together until 1904 when Group A showed no decrease from the normal crop. Groups A and B, Central, include those counties infested up to 1898 and first injured in 1900. Central Group C comprises nineteen counties infested between 1898 and 1901, and first showing a decrease in 1902 and 1903 for the most part. Central Group D comprises four counties in north central Texas and three in southeastern, first infested in 1902 and showing a decrease in 1903. Central Group E includes ten counties in west central Texas first infested in 1902 but which have shown no appreciable loss from the previous normal crop. The remaining groups, Eastern, Northeastern, Western, Northwestern and Southwestern, though somewhat infested in part, showed no decrease up to 1903, for which year these tables were first prepared. In 1904, six of the thirteen Eastern Group showed a decrease undoubtedly due to the weevil, which is shown in Table 1. It will be noted that except the different Central Groups, these groups of counties form fairly well-marked natural geographical divisions of

the State. The Central Groups are made merely for convenience in estimating the damage from year to year and show very strikingly the fact often observed that it requires about two years after a county becomes infested with the weevil before it is seriously injured.

In determining in what year a county first showed a decided decrease probably due to the weevil we have used the average yield per acre for that county from 1887 to 1895 as the average crop. If the average for the second year (or when the exact date of first infestation was unknown, any year beginning with the second year) was materially less than the average for that county, providing that the uninfested counties showed no decrease from normal yield in that year, that county was considered as first injured by the weevil in that year. If the uninfested counties showed a loss in a year, the difference in yield per acre was deducted from the apparent decrease of a county supposedly injured for the first time. Also where storms or floods were known to have seriously decreased the crop in certain counties, the injury was not attributed to the weevil in all cases. These latter factors and losses by other insects, it is of course impossible to accurately estimate. It is entirely safe to assume, however, that after the second year of infestation, the great bulk of the decrease is due to the weevil.

After determining the year in which each infested county first showed marked decrease as nearly as possible, and grouping them accordingly, it is an easy matter to assemble the totals of the injured groups for each year as given in Table 1. The injured area for each year is shown in figures 3, 4, 5, 6 and 7, together with lines showing the progress of previous infestation as related to this injury.

The total loss due to the weevil each year was determined as follows: The yield per acre for the injured and uninjured areas was determined. The yield per acre for the injured counties was then subtracted from their normal yield per acre from 1887 to 1895, giving the "apparent" decrease for the injured area. The yield per acre for the uninjured area for 1899 was then compared with its average yield per acre from 1887 to 1895, and the gain or loss computed in bales and bales per acre. Subsequent to 1899, instead of the yield per acre for the uninjured area from 1887 to 1895, was used the average of the years 1887 to 1895 and the years from 1899 to date inclusive, omitting 1896-1898 in which years there are no means of forming estimates by counties. The large crop of 1900 increased this average yield per acre for the uninjured area materially, making it 0.02 bales more per acre and in 1904 it was 0.05 bales per acre greater than the average from 1887 to 1895. If there was a gain in bales per acre in the uninjured area, the area of the injured counties was multiplied by the number of bales per acre gain for the uninjured counties and the result added to the "apparent" decrease for the injured counties, giving the "total bales decrease in the injured counties." If, on the other hand, the uninjured counties showed a loss from the average of the previous years, the loss in bales per acre was multiplied by the acreage injured and the result deducted from the "apparent" injury. Thus due weight is given to the seasonal increase or decrease of the uninjured area in reckoning the amount of injury. Had the "apparent" decrease been increased by the difference between the yield per acre of the uninjured area for a given year and its average

between 1887 and 1895 the "total decrease" would have been very much greater than by using the average of those years *plus* that of years since 1899 as given in column 9, Table 1. Had the average from 1887 to 1895 alone been thus used there would have been shown a total decrease of 325,000 bales against 258,489 given in 1902, 725,000 against 500,000 given in 1903, and about the same difference in 1904.

From the "total decrease" must be subtracted the losses due to storms, floods, and insects such as the boll worm, which is practically the only insect causing any large loss in the weevil injured area. These latter factors are exceedingly difficult to estimate. In 1899 there was a serious flood of the Brazos river, but it did not affect the injured counties. The Department of Agriculture estimates the injury due to the Galveston storm at 68,000 bales, and we have allowed 86,810 bales loss due to it and boll worm in 1900.

It should be noted also that had we computed the loss by using the acreage figures of the Department of Agriculture, which are uniformly larger than our estimate, the loss due to the weevil would have been much larger, as the yield per acre of the injured counties would have been very much less than even the apparent differences in total acreages would indicate, for the Department of Agriculture has estimated many of the injured counties as having actually increased their acreage during five years in which, in Table 2, we have indicated a decrease, which is supported by the best information obtainable.

The methods employed in this estimate of the losses due to the weevil have thus been purposely made as conservative as possible, while at the same time making due allowance for the increased or decreased production for the uninjured part of the State in determining the difference between the actual crop and what the normal crop should be for the injured area for the same years.

Let us consider the decrease due to the weevil year by year somewhat more in detail.

In 1899, the eighteen southern counties, practically those lying south of the Southern Pacific Railroad, having 5 per cent of the acreage and producing 4 per cent of the crop of that year, yielded but 0.28 bales per acre against a normal 0.43 bales per acre, while the balance of the State showed a decrease of but 0.15 bales per acre. The total decrease of these counties was, therefore, 0.135 bales per acre, or 174,718 bales, at least 150,000 bales of which may be due to the weevil. It may be noticed that these counties were all infested up to 1895. During 1896 and 1897 the weevil did not spread beyond the area infested in 1895. Probably nearly as large a loss occurred in these counties in 1898, were the acreage or crop figures available by counties for that year.

In 1898 the weevil advanced as far north as Burleson and Brazos counties (fig. 1), and as a result two years later, in 1900, a marked decrease is found in the production of all these counties, as graphically shown in figure 4. In 1900, however, the counties of Southern Group A produced better than a normal crop and Southern Group B practically a normal crop, though 0.15 bales per acre less than the increase in the balance of the State warranted. The thirteen counties of Central Group AB injured for the first time, yielded but 0.26 bales per acre, just half per acre that produced in the balance of the State. Together the

twenty injured counties showed a decrease of 0.30 bales per acre or 311,810 bales. From this must be deducted the loss due to the Galveston storm throughout south central Texas, which reduces the total loss to probably 200,000 bales. In 1900 the injured area was 15 per cent of the acreage of the State, three times that of 1899, and the injured area produced 18 per cent of the crop of 1899.

In 1901 the injured territory remained practically the same as in 1900, Caldwell county being the only one added. Though no records exist of the spread of the weevil in 1899, it is evident from the increased injury in 1902 and the area infested in 1901 that there was a considerable advance of infestation in 1900 and it seems probable that a very small migration in 1899, as in 1896-97, accounts for there being no larger area injured in 1901. The injured counties showed the same "apparent" decrease in 1901 as in 1900, but owing to a decrease of 0.05 bales per acre for the balance of the State, the total real decrease was but about one-third that in 1900, or 100,920 bales. In other words, the injured counties compared with the yields of the other counties in the State made a gain of 0.20 bales per acre in 1901 over 1900, though they actually produced but 0.01 bales per acre more.

In 1902 about half of the counties infested between 1898 and 1901 were added to the injured area of 1901, comprising nine of the counties of Central Group C, making 26 per cent of the total acreage injured, which acreage produced 35 per cent of the total crop of 1899. It was, therefore, in 1902 that the most productive counties in Texas were first injured, as the per cent of the total product produced in the injured counties was about 35 per cent greater than the per cent of the total acreage occupied by them.

The decrease in production in the injured counties was also more serious than previously, the thirty-two injured counties producing but 0.28 bales per acre, though owing to a decrease from normal of 0.03 bales per acre for the balance of the State, the actual decrease was 0.14 bales per acre, the same as in 1901, or 258,489 bales. From this must be deducted loss from the boll worm amounting to 5 per cent according to Prof. Mally's estimate (see his Report on the Boll Worm, 1902), which would be approximately 25,500 bales, and loss due to the Brazos river flood of at least an equal amount, so that the probable total loss attributable to the weevil was about 200,000 bales, about the same as in 1900.

The year 1903 witnessed an even greater relative enlargement of the injured area than 1902. All of the territory infested in 1901 and much of that which had been first reported infested in 1902, showed a marked decrease which was more striking in view of the fact that the balance of the State showed slightly better than a normal crop. Indeed, the advance of infestation and injury by the weevil may well be compared to the waves radiating from a pebble cast in water, the second following the first in concentric and ever-increasing circles, which lines of advance have, however, pushed more rapidly to the north in the case of the weevil; 38 per cent of the 1903 acreage, which produced 50 per cent of the crop in 1899, but only 26 per cent in 1903, and including some of the largest and most productive cotton counties of Texas, was injured in 1903. The injury in the counties previously injured, as

well as in the counties injured for the first time, was more serious than ever before, there being a yield of but 0.23 bales per acre in the 49 injured counties against 0.43 previously. This was no doubt largely due to the exceedingly late and wet season throughout the most of the State, favorable to the development of the weevil. The decrease for the injured counties amounted to 0.21 bales per acre or a total of 580,612. From this should be subtracted injury by the boll worm which was unusually severe, especially in Central Group D, probably amounting to 12 per cent for the whole forty-nine counties, leaving in round numbers 500,000 bales which may safely be attributed to injury by the boll weevil. The Southern Group A counties continued to show a normal crop in spite of the weevil.

The injury in 1904 was quite different in many respects from any previous years. The total acreage injured showed a decrease from that of 1903, due to the fact that nine counties in central Texas, Central Group A, Bell, Hays, Limestone and Williamson, having a total acreage of 8 per cent that of the State, and producing nearly 10 per cent of the total crop, produced better than a normal crop compared with the uninjured counties, though in 1903 they had all shown serious injury. In contrast to this encouraging feature, the twelve counties of Southern Group A, owing to a very mild winter, early spring, and allowing stubble cotton to remain over winter upon which the weevils commenced to multiply early, produced but half a normal crop, for the first time showing serious injury since 1899. In addition to the injured area of 1903 were seven counties in east Texas and ten southwestern counties, the outer limits of the area injured in 1904 being almost exactly those infested in 1902, except for the ten counties of Central Group E, which showed a better than normal crop, though many of them had been well infested in 1903 and all more or less in 1902. Together the sixty-nine injured counties showed an "apparent" decrease of 0.14 bales per acre, which with the increase of 0.08 bales per acre for the balance of the State gave 0.22 bales per acre total loss, practically the same as in 1903, making 586,478 bales decrease, slightly larger than for 1903. In 1904 there was comparatively little injury from the boll worm and loss from flood, so that 550,000 bales may safely be charged to the boll weevil. Had the nine counties which previously had shown a loss, but in 1904 made better than a normal crop, showed as much injury as those surrounding them, the total loss would have approximated 700,000 bales. Had the ten counties of Central Group 3 been injured as much as the seven eastern counties after two years of infestation, there would have been 175,000 bales further decrease. In other words, had the weevil been as injurious in the territory infested two years or over as previously, there would have been a loss of 875,000 bales of cotton due to the weevil in 1904. That this was not the case and that a phenomenal crop was made was undoubtedly due to the extremely favorable season, an early spring, hot summer, and a late growing season. These favorable weather conditions made possible the best possible results from the "cultural methods" of preventing injury by the weevil, consisting of early planting, early varieties, and thorough, continued cultivation. These methods were widely practiced by progressive planters and undoubtedly were a large factor in

producing a crop above the average for the uninjured counties, including nine of the largest counties which had previously shown serious loss, as well as lessening the loss in other counties. It should be borne in mind, however, that in spite of the large total crop the loss to over one-third the acreage of the State was as severe as in 1903 and was fully one-half the crop of those counties. Had there been no loss by the boll weevil in 1904 Texas would probably have produced 3,750,000 bales of cotton.

Footing up the bill which the boll weevil has enforced payment by the State of Texas we find a total of 1,725,000 bales loss during the past six years. Since its arrival in Texas 2,000,000 bales, worth nearly \$100,000,000, have undoubtedly been lost due to its devastations. If we consider the average yield of the injured territory as .438 bales per acre (averaging the six years), there has been a decrease of 43.2 per cent of the crop in this territory, averaging 0.182 bales per acre a year. In other words, it now takes 1.71 acres to produce the crop of one acre before the arrival of the weevil, or where 2.28 acres were formerly required to produce a bale of cotton 3.9 acres are now necessary.

THE FUTURE OUTLOOK.

What do these statistics teach which will tend to mitigate a present loss of from \$20,000,000 to \$25,000,000?

First, that as a whole this loss is increasing and that with a season such as 1903 the area now well infested by the weevil might show a loss of from 900,000 to 1,000,000 bales.

Second, that in extreme southern Texas the weevil rarely seriously injures the crop if stubble cotton is not allowed to remain over winter in mild winters.

Third, that there seems a probability that the weevil may not be so injurious in the western cotton counties.

Fourth, that in a favorable or average season a fair crop can be grown in spite of the weevil by the use of better methods, such as early planting, fertilization, better—more productive and earlier—varieties, more thorough, frequent and continued cultivation. It remains for future crops to show how much value these methods will have in an unfavorable year. It is the belief of the writer that these methods are of the greatest value and should be practiced intelligently by everyone, but he is prone to feel that not until the increase of the weevils is actually checked by the general destruction of the cotton stalks before frost in the fall, by the people generally, will there be a material reduction of loss by the weevil in at least one year out of three and possibly half of the time. It is high time that the State regulated the matter of the destruction of stumpage cotton in south Texas, and it should at least make experiments on a sufficiently large scale to demonstrate beyond any manner of doubt and to convince the most skeptical that the fall destruction of the stalks throughout the State is or is *not* the best means of controlling the pest, as advocated by all who have given it careful study.*

*Suggestions to this end, with a full discussion of the subject, were published by the writer in *Farm and Ranch*, October 8, 1904.

LEGENDS FOR FIGURES ACCOMPANYING ARTICLE ON INJURY TO COTTON CROP BY BOLL WEEVIL.—SANDERSON.

Fig. 1. Map of Texas showing the gradual spread of the boll weevil to August, 1904. ----- lines indicate probable infestation, but not actually reported. Lines for 1894, 1895, 1898, 1901 are those published or recorded by the Bureau of Entomology, U. S. Department of Agriculture, as are parts of those for 1903 and 1904. The line for 1902 is from records made mostly by Prof. F. W. Mally. The black line at the west indicates the western boundary of cotton culture in 1899.

Fig. 2. Map of Texas showing the groups of counties used in tabulation. The counties underlined are part of those included under "Far Western," Table IV.

Fig. 3. Counties injured by the boll weevil in 1899 are shaded.

Fig. 4. Counties showing a marked decrease in yield due to the boll weevil in 1900 and 1901 are shaded.

Fig. 5. Counties showing a marked decrease in yield due to the boll weevil are shaded.

Fig. 6. Counties showing a marked decrease in yield due to the boll weevil in 1903 are shaded.

Fig. 7. Counties showing a marked decrease in yield due to the boll weevil in 1904 are shaded. Counties injured by the weevil in 1903 which yielded better than a normal crop in 1904 are underlined.

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