

Kansas State Agricultural College

EXPERIMENT STATION—Circular No. 32

DEPARTMENT OF ENTOMOLOGY

Geo. A. Dean, Entomologist in Charge

BURN THE CHINCH BUG IN WINTER QUARTERS.

By Geo. A. DEAN and J. W. MCCOLLOCH.

SUMMARY.

1. During the spring and summer of 1913 it cost the farmers of the entire eastern half of Kansas an enormous sum in the aggregate to feed the chinch bugs.
2. Wherever the bugs have done serious damage, 98 per cent of them will be found in the fall in the bunch grass and bluestem in meadows, pastures, ravines, and along roadsides--**BURN THESE PLACES.**
3. After four years of careful experiments it has been found that November and early December is the best time to burn the winter quarters of the chinch bug.
4. Careful experiments show that fire supplemented by winter kills 985 out of every 1000 bugs.
5. The experiments show that the mortality of bugs from late winter and spring burning is much less than that from fall burning. See tables showing the relative difference between fall and late winter burning.
6. By actual counts and careful estimates it has been found that a roadside one-half mile long covered with bunch grass and bluestem harbored 3,520,000 bugs. Fall burning means the destruction of 3,484,800 of them.
7. Burning does not materially injure meadows or pastures.
8. To be most effective and to get the best results, co-operative fall burning is necessary.
9. It is, therefore, imperative for the farmer to find out whether his grasses are harboring a dangerous number of bugs, and if they are found to do so, he should burn all of the bug-infested grasses without delay and get his neighbors to follow his example.

10. The destruction of chinch-bug cover in a badly infested area of seventeen and one-half square miles during November and December of 1910 gave good results in crops the following summer, effecting in the seventeen and one-half square miles a saving of \$7000 on wheat alone, and freeing corn from the usual harvest-time injury.

11. Neglect to destroy these bugs, and with winter, spring and summer favorable to them, wheat, corn, cane and kafir will suffer most severely next year.

BURN THE CHINCH BUG IN WINTER QUARTERS. WHERE THEY ARE.

In fifty-eight counties of Kansas, representing more than the entire eastern half of the state, the farmers have suffered in the aggregate an enormous loss from the ravages of the chinch bug. In the regions in which during the spring and summer the bugs did noticeable damage, the chinch bugs will be found in the fall congregated in the bunch grasses, which grow along the roadsides, in the meadows, pastures, ravines and waste places. While the large majority of these bugs will go into winter quarters in clump-forming grasses and bluestem growing along roadsides and fences, in pastures and meadows adjacent to infested corn, sorghum, Kafir, milo, etc., in some cases several may be found hibernating in bunches of grass removed by considerable distances from the infested fields. It is, therefore, imperative-for the farmer to find out whether his grasses are harboring a dangerous number of bugs. This can be determined by parting the bunch grass and carefully examining the mulch of soil and decayed grass which usually gathers at the base of the stems. (Fig. 1.)

HOW TO KILL THEM.

Experiments covering four years show conclusively that the late fall and early winter is the time to fight the chinch bug. At this season, or during November and early December, they are congregated in the grasses which grow along the roadsides and fences, in pastures, meadows, ravines and waste places, and since it is an easy matter for each farmer to burn these off, it should be done just as soon as conditions will permit of

good burning. In the greater part of the infested area this year the per cent of grass land on the farm is small, and every farmer can clean up his place in a day's time, and the cost is practically nothing. (Fig. 2.)

The great advantage of early winter burning is that the farmer protects both his wheat and corn. Late fall and early winter destruction has been thoroughly demonstrated and found successful where it has been coöperatively carried on

over areas three miles square or more. In fact, the only essentials to make burning successful are cooperation and thorough work; that is, firing the infested clumps in such a manner as to make them burn close to the crown. (Figs. 3 and 4.) The only places that need to be burned over are those which contain growth of clump-forming grasses.

Although a few bugs are found behind the corn blades and in the trash in a stubble field, cornstalk and wheat-stubble land do not need to be burned over, for the few bugs that are there will die before spring.

COÖPERATION FOR THOROUGH AND SYSTEMATIC BURNING.

Inasmuch as cooperative and thorough work are very essential in order to make the burning successful, every county infested with the chinch bugs should organize for a complete destruction of the winter quarters of the chinch bug. If the organization is made a county affair, supported and encouraged not only by the county commissioners and the other county officers, but by every township official, the result naturally will be far more effective than if the work is taken up only locally. Every local organization, such as the Farmers' Grange, the Farmers' Institute, the Farmers' Union, the Anti-Horse Thief Association, etc., should lend its support and help in making the work effective. The several county and district farm demonstration agents, the extension department men, and the field agents of the Kansas State Agricultural College will help in every possible way in organizing for the work. The department of entomology through its field agents, together with the county and district demonstration agents, will keep in close touch with the chinch-bug situation, and just as soon as the bugs are in their winter quarters and the proper time has arrived for effective burning, will notify the proper officials of the various organizations and will assist in every possible way to get the work done at the right time.

RECORD OF AVERAGE WINTER MORTALITY IN DIFFERENT TYPES OF COVER.

<i>Type of Cover.</i>	<i>Bugs that perished.</i>
BUNCH GRASS.—AS many as 3000 to 5000 bugs per clump, with an average of about 1000.....	15-40
BIG BLUESTEM.—About one-half as many bugs as in the bunch grass,.....	15-40
CORN HUSKS AND STALKS.—Very few bugs	90-100
DRY PIECES OF MANURE.--Three to fifty bugs per piece	95-98
OSAGE ORANGE,—Few bugs..	95-99
OSAGE ORANGE TREE BARK.—Few bugs	90-100
RUBBISH, LEAVES, ETC.-Few bugs	90-100
TURNIPS.—Five to fifty bugs in each plant	90-100

TABLES SHOWING MORTALITY OF BUGS IN BURNED AND UNBURNED GRASS IN DIFFERENT LOCALITIES.

ELLIS COUNTY (1910-1911).

Clump No.	Diameter of clump.	Date of burning.	Degree of burning.	Date of count.	Total number bugs.	Number dead.	Per cent dead.
1...	5 in...	11-19-10.....	About 2½ in. from crown.	2-14-11	18	10	55.5
2...	3½ in...	do.	2 in. from crown.....	do.	22	20	90.9
3...	4 in...	do.	2 in. do.	do.	117	117	100.0
4...	4½ in...	do.	¾ in. do.	do.	10	10	100.0
5...	5 in...	do.	1 in. do.	do.	7	6	85.7
6...	3½ in...	do.	1 in. do.	do.	29	29	100.0
7...	8 in...	do.	1 in. do.	do.	16	15	93.7
8...	4 in...	do.	2 in. do.	do.	30	30	100.0
9...	5½ in...	do.	1¼ in. do.	do.	27	25	92.6
10...	4 in...	do.	1 in. do.	do.	18	17	94.4
11...	7½ in...	do.	2 in. do.	do.	7	7	100.0
12...	4½ in...	Not burned	.....	do.	56	21	37.5
13...	3 in...	do. ....	.....	do.	87	35	40.2
14...	3½ in...	do. ....	.....	do.	57	32	56.1
15...	3¼ in...	do. ....	.....	do.	39	0	0.0
16...	4½ in...	do. ....	.....	do.	767	330	43.0

SUMNER COUNTY (1910-1911).

Clump No.	Diameter of clump.	Date of burning.	Degree of burning.	Date of count.	Total number bugs.	Number dead.	Per cent dead.
1...	2½ in..	11-15-10.....	½ in. from crown.	2-19-11	183	183	100.0
2...	2½ in..	11-15-10.....	1 to 1½ in. do.	do.	83	80	96.3
3...	2¾ in..	11-10-10.....	1½ in. do.	do.	25	25	100.0
4...	2½ in..	12-10-10.....	1 in. do.	do.	109	101	92.6
5...	4½ in..	12-10-10.....	3 to 4 in. do.	do.	898	735	81.8
6...	3 in...	11- 9-10.....	1 in. do.	do.	231	249	88.6
7...	3 in...	12- 1-10.....	1 in. do.	3-14-11	39	37	94.7
8...	3½ in..	12- 1-10.....	1 to 1¾ in. do.	do.	47	47	100.0
9...	4 to 5 in.	12- 8-10.....	2 to 2¼ in. do.	do.	57	57	100.0
10...	4½ in..	12- 8-10.....	1½ to 2 in. do.	do.	83	72	86.7
11...	3 in...	11- 9-10.....	½ to ¾ in. do.	do.	53	52	98.1
12...	3 in...	11-15-10.....	¾ to 1 in. do.	do.	99	92	93.0
13...	4½ in..	Spring burning..	1½ to 1¾ in. do.	do.	835	483	57.8
14...	4 in...	do. do.	1 to 1½ in. do.	3-31-11	114	86	75.4
15...	6 in...	do. do.	1½ to 2 in. do.	do.	345	249	72.1
16...	3 in...	do. do.	2 to 2¼ in. do.	do.	67	50	74.6
17...	4½ in..	Not burned	.....	2- 9-11	1,059	354	33.4
18...	4½ in..	do. ....	.....	do.	3,111	1,560	50.1
19...	5 in...	do. ....	.....	3-14-11	264	67	25.3
20...	5 in...	do. ....	.....	3-31-11	213	116	54.5

CHEROKEE COUNTY (1912-1913).

Clump No.	Kind of grass.	Size of clump.	Date of burning.	Date of count.	Total number bugs.	Number dead bugs.	Per cent dead.
1....	Bunch grass..	Medium.....	12-12-12*	3-12-13	77	34	44.1
2....	Sedge	do.	do. *	do.	1,557	1,374	88.2
3....	Bunch grass..	do.	do. *	do.	351	207	59.0
4....	do.	do.	do. *	do.	185	58	31.3
5....	do.	Small.....	About March 1...	do.	759	216	28.4
6....	do.	Medium.....	do.	do.	412	181	43.9
7....	do.	do.	Not burned.....	do.	48	4	8.3
8....	do.	do.	do.	do.	154	6	3.9
9....	do.	Large.....	do.	do.	1,863	12	.6
10....	do.	do.	do.	do.	2,118	106	5.0

* Burned a few days after a snow.

RILEY COUNTY (1912-1913).

Clump No.	Size of clump.	Date of burning.	Date of count.	Total number bugs.	Number dead bugs.	Per cent dead.
1....	6 in. by 4 in.....	12-4-12.....	3-17-13.....	534	426	79.7
2....	4 in. by 3 in.....	do.	do.	1,519	1,473	96.9
3....	4 in. by 3 in.....	do.	do.	790	770	97.4
4....	5½ in. by 4 in.....	do.	do.	1,171	1,139	97.2
5....	5 in. by 3 in.....	do.	do.	264	183	69.3
6....	5 in. by 3 in.....	do.	do.	84	49	58.3

TABLE SHOWING RELATIVE DIFFERENCE IN THE MORTALITY OF BUGS OF FALL AND LATE WINTER BURNING OF BLUESTEM AND BUNCH GRASS.

BLUESTEM.

Clump No.	Date of burning.	Date of count.	Total number bugs.	Number dead bugs.	Per cent dead.
1....	Fall, 1911.....	2-14-12	578	448	77.5
2....	do.	do.	339	311	91.7
3....	do.	do.	576	521	90.4
4....	do.	4-6-12	606	537	88.6
5....	do.	do.	493	470	95.3
<i>Late winter.</i>					
6....	2-12-12.....	2-14-12	787	118	14.7
7....	do.	do.	715	207	28.9
8....	do.	do.	244	138	56.5
9....	2-17-12.....	2-19-12	110	68	61.8
10....	Feb., 1912.....	4-6-12	1,667	896	53.8
11....	do.	do.	1,044	625	59.8

BUNCH GRASS.

Clump No.	Date of burning.	Date of count.	Total number bugs.	Number dead bugs.	Per cent dead.
1....	Fall, 1911.....	2- 6-12	1,011	988	97.7
2....	do.	do.	1,426	1,412	99.0
3....	do.	do.	502	476	94.8
4....	do.	4- 6-12	810	781	96.4
5....	do.	do.	1,754	1,642	93.6
	<i>Late winter.</i>				
6....	2-12-12.....	2-14-12	4,008	3,176	79.2
7....	do.	do.	5,231	2,814	53.7
8....	2-17-22.....	2-19-12	798	474	59.3
9....	Feb., 1912.....	4- 6-12	2,414	1,293	53.5
10....	do.	do.	1,614	941	58.3



(After Headlee.)

FIG. 1.—Bunch grass, the winter home of the chinch bug. Burn it.



FIG. 2.—What should be done with bug-infested grasses, in waste places, along roadsides and fences, in pastures and mown meadows of native grass.
(After Headlee.)



FIG. 3.—The type of burning that kills few bugs—not close enough.
(After Headlee.)



FIG. 4.—The type of burning that kills practically 100 per cent of the bugs.
(After Headlee.)