### UNITED STATES DEPARTMENT OF AGRICULTURE AGRICULTURAL RESEARCH ADMINISTRATION BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

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INSECT PEST SURVEY

SPECIAL SUPPLEMENT (1946, No. 5) Issued August 1, 1946

REPORT UPON COOPERATIVE POTATO TUBER WORM SURVEY IN 1945 AND A SUMMARY FOR THE YEARS 1942 to 1945

By W. H. White, Bureau of Entomology and Plant Quarantine, in Cooperation with State and Experiment Station Entomologists

#### The 1945 Survey

The cooperative potato tuber worm survey of 1945 followed essentially the same procedure as during the preceding three years and included a systematic search for and examination of potato fields, potato storages, cull piles, packing sheds and similar situations where potatoes are handled, as well as fields of host plants other than potato such as tobacco, tomato, eggplant, pepper, and susceptible weeds. The survey activities during 1945 were conducted in Iowa and Missouri, the only two states where examinations had not been made during the preceding three years, and in some of the counties of northern California in which infestation had not been found.

The principal data obtained in Iowa and Missouri during 1945 are given opposite the names of these states in table 1. A total of 57 counties were examined in these two states, which required a total of 108 man-hours. This work involved the examination of 90 potato fields and garden plantings of potatoes, 14 tobacco fields and 4 fields of miscellaneous crops or patches of wild host plants. A list of the counties found infested by the potato tuber worm in Iowa and Missouri during 1945 is given opposite these states in table 2, and the names of the counties examinel are listed in table 3.

The potato tuber worm was found in the field during 1945 and positive identification made by specialists of the Division of Insect Identication of this Bureau, in 4 counties in Iowa and in 10 counties of Missouri. In Iowa the insect was found in the field and identified in potato, tobacco, and eggplant, and in Missouri in potato, tobacco, and horsenettle.

#### Summary of Surveys for the Years 1942-1945, Inclusive

The cooperative potato tuber worm survey was started in 1942 and completed in 1945. During the 4-year period involved the various Federal and State cooperators made examinations in all the 48 states. Some of these examinations were made incidental to other survey activities, principally the golden nematode survey, the oriental fruit moth survey, and the survey made primarily at and in the vicinity of Ports of Entry with particular reference to a search for introduced insects. During the 4-year period of the surveys, the potato tuber worm was found, in the field, or in storage, and positive identification made by specialists of the Division of Insect Identification of this Bureau, in the following 25 states:

Alabama	Iowa	Ohio
Arizona	Louisiana	Pennsylvania
Arkansas	Maryland	South Carolina
California	Mississippi	Tennessee
Colorado	Missouri	Texas
Delaware	Nebraska	Virginia
Florida	New Jersey	Washington
Georgia	North Carolina	Wisconsin
Indiana		

In addition, the insect was collected and identified from potatoes in storage found in two localities of Nevada that had originated outside the state.

A summary of the principal data obtained during the 4-year period of the surveys is given in table 1. It will be noted from this table that a total of 797 counties or parishes were examined in the 48 states, which required a total of 11,291 man-hours. This work involved the examination of 5,262 potato fields and garden plantings of potatoes, 1,672 potato storages, cull piles, and similar situations, 178 tobacco fields and 434 fields of miscelaneous crops or patches of wild host plants. A complete list of counties or parishes found infested by the potato tuber worm during the 4-year period of the surveys is given in table 2, and the names of the counties or parishes examined in all of the 48 states are listed in table 3.

According to the information given in Insect Pest Survey Bulletin 21, Supplement to No. 9 (Nov. 8, 1941) under the title of "Records of Distribution of the Potato Tuber Worm (Gnorimoschema operculella (Zell.)) in the United States," this insect had not been found in New Jersey prior to 1943 or in Delaware prior to 1944, although recorded previously from stored potatoes in the latter state. Field infestations in Texas had been recorded prior to 1943. In the instance of Pennsylvania, a heavy infestation of the potato tuber worm was found near Shippensburg, Cumberland County, during 1930, but this infestation was reported as being eradicated and the 1944 record is the first field infestation found since that date. In the State of Washington the cooperative survey during 1942 failed to reveal the presence of the insect but a single specimen was found in the field during 1944. In Iowa the potato tuber worm had been found at widely distributed points in 1918 and each year during the period 1933 to 1937, inclusive, but the 1945 record was the first occurrence recorded since the latter date. In Missouri the insect was reported as being found on tobacco in Platte County, during 1929, and the 1945 record is the first infestation reported since that date. The occurrence of the potato tuber worm in Arizona was recorded by K. B. McKinney in an article entitled "Common Insects Attacking Sugar Beets and Vegetable Crops in the Salt River Valley of Arizona," that appeared in the Journal of Economic Entomology, Vol. 32, No. 6, pp. 808-810, December 1939. This report was overlooked when compiling information for the abovementioned Insect Pest Survey Bulletin 21. In 1944 the presence of the insect in the field in Arizona was again established during the progress of this survey.

Thanks are expressed to the State authorities who participated in the survey, to the personnel of other Divisions of the Bureau who assisted in this work, and also to the specialists of the Division of Insect Identification for their painstaking work in making specific identifications of the material submitted. Appreciation is expressed to H. H. Keifer, Associate Systematic Entomologist, State of California Department of Agriculture, who furnished records of potato tuber worm occurrence in the following 10 counties of California not obtained by Federal workers: Butte, Contra Costa, Kern, Madera, Merced, San Benito, San Francisco, Sonoma, Stanislaus, and Yolo.

The attached colored map shows the following important information obtained during the cooperative potato tuber worm survey in the years 1942-1945, inclusive: (1) Counties or parishes where the insect was found in potatoes. (2) Counties or parishes where the insect was found in tobacco, other crops, or wild host plants. (3) Counties or parishes surveyed but no potato tuber worm infestation found.

# 1946 NOTE

Since this report was prepared, adults of the potato tuber worm were collected, during July 1946, from a potato storage cellar at Burley, Cassia County, Idaho. An adult was also collected from weeds growing near Burley. These identifications were made by specialists of the Division of Insect Identification of this Bureau. The source of these findings is reported to be potatoes which originated outside the State of Idaho. Unverified press reports state that the insect was also taken in Idaho at Caldwell, St. Anthony, and Idaho Falls, also in connection with potato shipments.

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	State	Counties or parishes surveyed	Potato fields and gardens	Potato Storages, Cull piles, et cetera	Tobacco fields	Other crops and wild hosts	Total	Fotato flelds and gardens		Tobacco fields	Other crope and wild hosts	Total *
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	Delaware	ŝ	150	83	0	0	233	0	0	0	0	0
	Florida	27	64	19	01	60	213	13	4	8	8	23
	Georgia	0	9		72	õ, G	108	0	0	28	2	30
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	Maine	4	570	81	0	0	651	0	0	0	0	0
	Maryland	6	52	6	9	0	8	4	0	0	0	4
	Massachusetts	11	161	26	0	0	187	0	0	0	0	0
	Michigan	17	489	53	0	0	491	0	0	0	0	0
	Minnesota	25	413	232	0	m	648	0	0	0	0	0
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	* TDCTNGES IDECA	DOOB Where nor	e than one s	pecies of host pi	Lant was for	md infested in	individual o	ounties.				

- Induces recorded where where we groups of how prove an own in instrumt counties. A Induces recorded by the vorm over courrence in 10 counties of California furnished in October, 1945, by H. H. Keifer, Associate Systematic Entomologist, State of California Department of Agriculture. B-Moths found in storage in one county in 1941. C-Specimens of potato tuber vorms were found in stored potatoes at Reno and Elko, Nevada, in 1944. The infested potatoes originated outside the State of Nevada.

Table 2 - List of counties found infested by potato tuber worm during 1942-1945, inclusive

Alabama Baldwin	Jefferson	Lee	Lincoln	Wisconsin
	Lafayette	Muscatine	Otoe	Columbia
Covington Marshall	Lee	Story		Crawford
Marshall Mobile	Leon		New Jersey	Dane
MODITE	Liberty	Louisiana	Burlington	Dodge
rizona	Madison	Acadia	Camden	Fond du Lac
Cochise	Manatee	Ascension		Grant
Maricopa	Monroe	Assumption	Cape May	Iowa
Pima	Orange	East Baton Rouge	Cumberland	Jefferson
Santa Cruz	Palm Beach	Theria	Gloucester	La Crosse
Daliba Uluz	Putnam	Iberville	Ocean	Marathon
rkansas	Sarasota	Jefferson Davis	Salem	Milwaukee
White	St. Johns	Lafayette		Monroe
MIT OC	Suwannee	Lafourche	North Comolina	Oneida
alifornia	Taylor	Livingston	North Carolina	Outagamie
Alameda	O	Plaquemines	Beaufort	Polk
Butte	Georgia	St. James	Camden	Portage
Contra Costa	Atkinson	St. John the	Carteret	Racine
Kern	Ben Hill	Baptist	Currituck	Richland
Los Angeles	Berrien	St. Landry	Pamlico	Rock
Madera	Brantley	St. Martin	Pasquotank	Sauk
Merced	Brooks	St. Mary	Tyrrell	Shawano
Monterey	Bryan	St. Tammany		Vernon
	Bulloch	Tangipahoa	Ohio	Walworth
Orange San Benito	Charlton	Terrebonne	Franklin	Waukesha
	Chatham	West Baton Rouge	Sandusky	Waupaca
San Diego San Francisco	Clinch			Winnebago
	001100	Maryland	Pennsylvania	
San Joaquin San Luis Obis	Colquitt	Calvert	Philadelphia	
Santa Barbara	1 0004	Somerset		
Santa Clara	200000	Wicomico	South Carolina	
Santa Cruz	Echols	Worcester	Charleston	
	Effingham		Horry	
Solano Sonoma	Glynn	Mississippi		
Stanislaus	Grady	Harrison	Tennessee	mager within materiality land for a
Yolo	Irwin	Jackson	Montgomery	
1010	Lanier	Pearl River		
olorado	Lowndes		Texas	
Montrose	McIntosh	Missouri	Bailey	
MOLLELOSE	Mitchell	Boone	Cameron	
elaware	Pierce	Bollinger	Dallam	
Kent	Spalding	Callaway	Deaf Smith	
Sussex	Thomas	Cooper	Dimmit	
Susser	Tift	Clay	Hale	
lorida	Turner	Dallas	Hidalgo	
Alachua	Ware	Howard	Lubbock	
Clay	Worth	Lafayette		
Columbia	Tudiores	Platte	Virginia	
Dixie	Indiana:	Pike	Northampton	
Gadsden	DeKalb	Nahao ala	Princess Anne	)
Gilchrist	Totto	Nebraska	I to all for all or	
Hamilton	Iowa:	Box Butte	Washington	
Indian River	Cass	Buffalo	Yakima	
Indian Kiver		Lancaster		

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Table 3.- List of counties examined for potato tuber worm during 1942-1945, inclusive

Alabama	Colorado		1 ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) (	
Baldwin	Alamosa	Madison	McIntosh	Nez Perce
Covington	Cone jos	Manatee	Mitchell	Oneida
Dallas	Delta	Monroe	Pierce	Owyhee
Jefferson	Dolores		Rabun	Payette
Marshall		Orange Deilm Depak		Power
Mobile	Eagle	Palm Beach	Spalding	Shoshone
	Garfield	Putnam	Thomas	Teton
Arizona	La Plata Mesa	Sarasota St. Johns	Tift Turner	Twin Falls
Cochise	Montezuma	Suwannee	Walton	Valley
Coconino	Montrose	Taylor	Ware	Washington
Graham	Morgan		Wayne	
Greenlee	Rio Grande	Georgia	Wilkes	Illinois
Maricopa	Saguache	Atkinson	Worth	Adams
Pima	Sedgwick .Weld	Barrow	T.J 1	Cook
Pinal	. WEIU	Banks	Idaho	Jo Daviess
Santa Cruz	Common the suit	Ben Hill	Ada	Madison
Yavapai	Connecticut	Berrien	Adams	McHenry Saint Clair
Yuma	Fairfield	Brantley	Bannock	
T CHING	Hartford	Brooks	Bear Lake	Will
Arkansas	Litchfield	Bryan	Benewah	
Howard	Middlesex	Bulloch	Bingham	Indiana
White	New Haven	Camden	Blaine	Allen
WILLCE	New London	Charlton	Boise	DeKalb
California	Tolland	Chatham .	Bonner	Elkhart
Alameda	Windham	Cherokee	Bonneville	Fulton
Butte	Delaware	Clinch Coffee	Boundary Butte	Kosciusko Lagrange
Contra Costa		Colquitt	Camas	Lake
Humboldt	New Castle	Cook	Canyon	La Porte
Kern	Sussex	Dawson	Caribou	Marshall
Los Angeles		Decatur	Cassia	Noble
Madera	Florida	Echols	Clark	Porter
Merced		Effingham	Clearwater	Pulaski
Mendocino	Alachua Broward	Elbert	Custer	Starke
Modoc	Clay	Forsyth	Elmore	Steuben
Monterey	Columbia	Gilmer	Franklin	Saint Joseph
Orange	Collier	Glynn	Fremont	
San Benito	Dade	Grady	Gem	Iowa
San Diego	Dixie	Gwinnett	Gooding	Allamakee
San Francisc	<sup>O</sup> Gadsden	Habersham	Idaho	Boone
San Joaquin	Gilchrist	Hall	Jefferson	Benton
San Luis Obi	spo Hamilton	Hart	Jerome	Clinton
Santa Barbar		Irwin '	Kootena	Clayton
Santa Clara	Jackson	Jackson	Latah	Clay
Santa Cruz	Jefferson	Lanier	Lemhi	Cass
Siskiyou	Lafayette	Liberty	Lewis	Carrol
Solano	Lee	Lincoln	Lincoln	Cerro Gordo
Sonoma	Leon	Long	Madison	Decatur
Stanislaus	Liberty	Lowndes	Minidoka .	Dallas
Yolo	TTOCT ON			

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Table 3.- List of counties examined for potato tuber worm during 1942-1945, inclusive (continued)

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Iowa (Cont'd)	Iberia	Middlesex	Mississippi	Montana
Dubuque	Iberville	Norfolk	Attala	Beaverhead
Des Moines	Jackson	Plymouth	Calhoun	Big Horn
Franklin	Jefferson Davis	Worcester	Coahoma	Blaine
Grundy	Lafayette		Harrison	Carbon
Hamilton	La Fourche	Michigan	Hinds	Cascade
Hardin	Livingston	Antrim	Holmes	Chouteau
Louisa	Plaquemines	Bay	Humphreys	Custer
Lee	Pointe Coupee	Emmet	Issaquena	Dawson
Marshall	Rapides	Grand Traverse	Jackson	Deer Lodge
Monona	St. Charles	Houghton	Jasper	Flathead
Muscatine	St. James	Jackson	Lauderdale	Gallatin
0'Brien	St. John the	Kent	Leake	Hill
Pottawattam	ie Baptist	Lapeer	Leflore	Jefferson
Plymouth	St. Landry	Lenawee	Madison	Lake
Polk	St. Martin	Macomb	Newton	Lewis and
Story	St. Mary	Marquette	Pearl River	Clark
Sioux	St. Tammany	Monroe	Sunflower	Madison
Tama	Tangipahoa	Montcalm	Tate	Missoula
Woodbury	Terrebonne	Osceola	Washington	Phillips
Winneshiek	Washington	Otsego	Wayne	Powell
WTITTESUTEY	West Baton Roug		Yelobusha	Prairie
Vongog	West Feliciana	Wex ford	1010000010	Ravilli
Kansas	Winn		Missouri	Richland
Cowley		Minnesota	Boone	Roosevelt
Douglas	Maine	Aitkin	Bollinger	Rosebud
Jefferson	Aroostook	Anoka	Butler	Teton
Johnson	Penobscot	Becker	Callaway	Valley
Leavenworth		Benton	Canden	Yellowstone
Reno	Waldo	Beltrami	Carrol	16110460010
		Chisago	Chariton	Nebraska
Riley	Maryland	Clay		Adams
Sedgwick	Calvert	Freeborn	Cooper	Antelope
Shawnee	Charles	Goodhue	Dallas	Box Butte
Summer	Frederick	Hennepin		Buffalo
Wyandotte	Garrett	Isenti	Greene Howell	Cass
, i i i i i i i i i i i i i i i i i i i	Montgomery	Itasca	Howard	Cheyenne
Kentucky	Somerset	Kittson		Clay
Christian	St. Marys	Marshall	Lafayette	Dakota
Jefferson	Wicomico	Mille Lacs	Miller	
Logan	Worcester	Morrison	Platte	Dawes Duel
Muhlenberg		Norman	Pike	Fillmore
Oldham	Massachusetts	Otter Tail	Pemiscot	Franklin
Todd	Barnstable	Pine	Ray	•
	Berkshire	Polk	Randolph	Gage
Louisiana	Bristol		Saline	Garden
Acadia	Essex	Ramsey Roseau	Shannon	Hall
Ascension	Franklin		Stoddard	Johnson
Assumption	Hampden	Stearns	St. Louis	Kimball
Avoyelles	Hampshire	Todd	Texas	Lancaster
East Baton		Wadena	Webster	Lincoln
East Felici	0			

Table 3.- List of counties examined for potato tuber worm during 1942-1945, inclusive (continued)

Nebraska (Cont'	d) Chenango	Ohio	Marion	Cumberland
Morrill	Clinton	Ashtabula	Multnomah	Davidson
Otoe	Cortland	Brown	Polk	Fentress
Pawnee		Butler	Tillamook	Franklin
Platte	Erie	Champaign	Washington	Grundy
Richardson	Essex	Clark	Yamhill	Montgomery
Saunders	Franklin	Clermont		Moore
Scottsbluff	Genesee	Clinton	Pennsylvania	Morgan
Sheridan	Livingston	Columbiana		Putnam
Sioux	Madison	Coshocton	Bucks	Robertson
Washington	Monroe	Darke	Cambria	Scott
York	Nassau	Delaware	Chester	White
	Niegara	Erie	Cumberland	
Nevada	Oneida	Fayette	Dauphin	Texas
Elko	Onondaga	Franklin	Delaware	Angelina
Humboldt	Orleans	Geauga	Erie	Austin
Lyon	Seneca	Hardin	Franklin	Atascosa
Pershing	Steuben	Highland	Lancaster	Bailey
Washoe	Suffolk	Huron	Lehigh	Bexar
	Washington	Licking	Luzerne	Bowie
New Hampshire	Wayne	Lorain	Montgomery	Cameron
Belknap	Westchester	Lucas	Northampton	
Carroll	Wyoming	Madison	Philadelphia	Camp
Cheshire	n' jointing	Morrow	Potter	Castro
Coos	North Carolina	Ottawa	Schuylkill	Cherokee
Grafton	Beaufort	Paulding	Somerset	Colorado
Hillsboro	Camden	Pickaway	York	Comanche
Merrimack	Carteret	Richland	IOIK	Dallam
Rockingham	Currituck	Sandusky	Rhode Island	Dallas
Strafford	Pamlico	Seneca	Bristol	Deaf Smith
Sullivan	Pasquotank	Wayne	Kent	Dimmit
	Tyrrell	Wood	Newport	Erath
New Jersey	TATTGIT		Providence	Fannin
Burlington	North Dakota	Oklahoma	Washington	
Camden	Barnes	Bryan	Washing ton	Fort Bend Franklin
Cape May	Benson	Choctaw	South Carolina	
Cumberland	Case	Haskell	Beaufort	Gillespie
Gloucester	Foster	Le Flore	Charleston	Gregg
Mercer	Griggs	McCurtain	Horry	Hale Harris
Middlesex	Grand Forks	Muskogee		Harris Hidalgo
Monmouth	McHenry	Okfuskee	South Dakota	
Ocean	Pembina	Payne	Brookings	Hockley Lamar
Salem	Ramsey	Pottawaton	lie Clark	Lavaca
Datem	Richland	Tulsa	Codington	Lubbock
New Mexico	Stutsman	Wagoner	Day	
Bernalillo	Traill		Deuel	Nacogdoches Polk
Sandoval	Towner	Oregon	Grant	Red River
Valencia	Walsh	Benton	Marshall	Rusk
VATEHOIS	Wells	Klamath	Roberts	Shelby
New York	Ward	Lane		Swith
Allegany	Williams	Lincoln	Tennessee	Tarrant
Broome		Linn	Cheatham	
			Coffee	Titus

Table 3.- List of counties examined for potato tuber worm during 1942-1945, inclusive (continued)

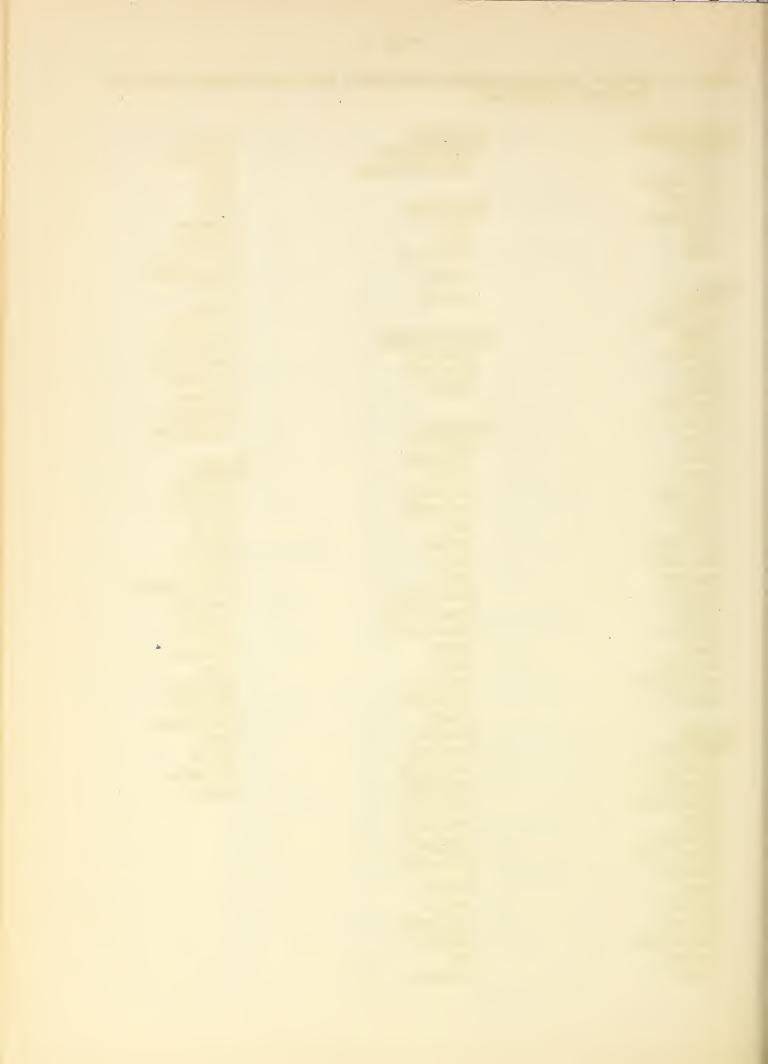
Texas Cont'd) Travis Upshur Van Zandt Wharton Wilbarger Wise Wood Utah Beaver Box Elder Cache Carbon Davis Emery Garfield Grand Iron Juab Kane Millard Morgan Piute Salt Lake San Juan Sanpete Sevier Summit Tooele

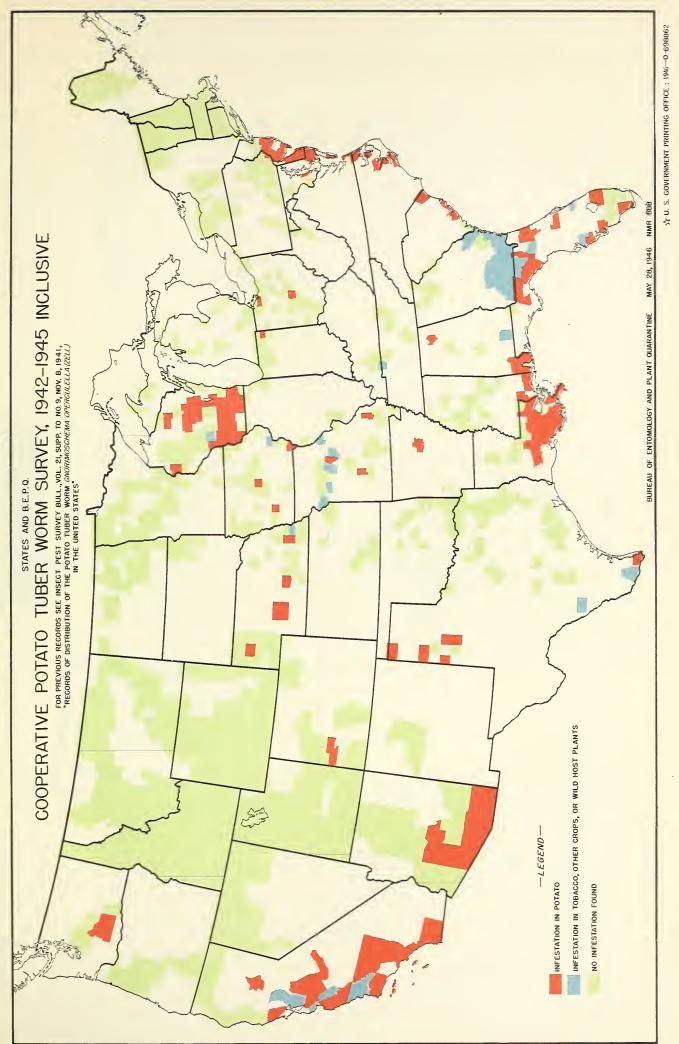
# Utah Wasabch Washington Weber

## Vermont

Addison Bennington Caledonia Chittenden Essex Franklin Grand Isle Lamoille Orange Orleans Rutland Washington Windham Windsor Viriginia Northampton Princess Anne Washington Benton King Kittitas Pierce Yakima West Virginia Preston Randolph Tucker Wisconsin Barron Chippewa Clark Columbia Crawford Dane Dodge Door Dunn Eau Claire Fond du Lac Green Lake Grant Iowa Jackson Jefferson Juneau Kenosha Kewaunee La Crosse Langlade Manitowoc Marathon Marquette Milwaukee Monroe Oneida Outagamie Ozaukee Polk Portage

Racine Richland Rock Rusk Sauk Shawano Sawyer St. Croix Trempealeau Vilas Vernon Walworth Washburn Washington Waukesha Waupaca Waushara Winnebago Wyoming Albany Big Horn Carbon Crook Fremont Goshen Hot Springs Laramie Lincoln Natrona Niobrara Park Sheridan Sublette Sweetwater Teton Unita Washakie Weston





GUPPEN VERIAL RECORD AUG 13 1946 U.S. TELGRIOULTURS