

FOR PROJECT:

PROJECT NUMBER 1879
State Leader 1879
County 84

4.15
COOPERATIVE EXTENSION WORK
UNIVERSITY OF CALIFORNIA
College of Agriculture

THE UNITED STATES DEPARTMENT OF AGRICULTURE
States Relations Service
Cooperating with

THE BOARD OF SUPERVISORS OF SAN DIEGO COUNTY, CALIFORNIA

I. NAME OF PROJECT: Citrus cover crops for San Diego County.

II. LOCATION: San Diego County, California.

III. DATE EFFECTIVE: August 1, 1923.

IV. OBJECT: To determine the winter cover crop best adopted to San Diego County conditions and to demonstrate the benefits to be derived in a citrus orchard by an intelligent use of winter cover crops over a period of years.

V. GOALS FOR 1923. The goal this year will be to determine the cover crops that will make the most satisfactory growth in the citrus orchards in San Diego County.

VI. HISTORY: The soil fertility in citrus orchards can only be maintained by a constant application of some outside source of soil building material. This must of necessity be supplied in a form sufficiently cheap that when manufactured into fruit by citrus trees, a profit may be realized by the grower on the transaction. Green cover crops have proven to be one of the cheapest sources for supplying the soil fertility. Various irrigation factors and climatic conditions make it necessary that this crop be grown during the winter months in San Diego County. Various crops have been grown with varying degrees of success. It is to determine the most practical to grow under San Diego conditions that the Extension Service has adopted this project.

VII. PROCEDURE:

Subject matter.

Experiments with various cover crops for citrus orchards have been carried on in various sections of the citrus belt of California. However a wide range of soil climatic and irrigation conditions are encountered in different sections of the citrus belt and in order to determine the

one best adapted to San Diego County conditions that experimental plots will be established in Escondido, El Cajon and Fallbrook sections. On these plots the following cover crops will be grown during the winter of 1923 and 1924:

1. Melilotus indica
2. Vetch, common.
3. Vetch, purple.
4. Windsor beans--small seeds.
5. Canadian field peas.
6. Barley & Canadian field peas.

2. Procedure--General extension methods. Test plots will be located in at least three different sections of the citrus belt of San Diego County and it is hoped that a cover crop well adapted for local conditions in these various localities will be found. The work will be followed up from year to year and the Extension Service believes that some very striking results will be obtained from the proper use of such cover crops.

3. PROCEDURE CALENDAR FOR 1923.

When	What	Who	Comp.
Aug. & Sept.	Secure cooperators	Ex. Service	
Sept.	Secure seed for planting plot "	"	
Sept-Oct.	Plant test plots	Cooperators	
Jan.	Check growth of crops	Ex. Service and Ex. Specialist.	
Feb.	Check comparative value of different cover crops as to growth	Ex. Service.	

VIII. ADDITIONS WILL BE SUBMITTED ANNUALLY.

Dec 5, 1923
Date

B. H. Cochran
Extension Director

Dec 2 - 1923
Date.

W. R. Lebowitz
Extension Specialist.

Nov 2 - 1923
Date.

L. B. Wildermuth
Ass't. Farm Advisor.

Nov 2nd - 1923
Date

James. L. France
Farm Advisor

FARM ADVISOR PROJECT

Project numbers:

State Leader _____

County 84

PROGRESS REPORT

CITRUS COVER CROPS

Arrangements were made for locating citrus cover crops demonstrations in Fallbrook, Escondido and El Cajon sections. Mr. A. B. Clemens was secured as cooperator in the Fallbrook section. Mr. Clemens's orchard is planted on decomposed granite soil with a North and West slope. The trees are of two different ages. One half of the orchard the trees are about ten years old, the remainder of the orchard being younger trees. The entire orchard is irrigated by over head sprinkling system. The cover crops used were Melilotus indica, Purple and Common vetch, Canadian field peas and small seeded Windsor beans. The accompanying diagram shows the plan of the cover crops. The trees are laid out on a contour system necessitating an irregular planting of the various crops. In the young orchard a little over one acre was planted to Melilotus indica at the rate of 20 lbs. per acre. $\frac{1}{4}$ acre was planted to Canadian field peas at the rate of 70 lbs. $\frac{1}{4}$ acre was planted to small seeded Windsor beans at the rate of 70 lbs. $\frac{1}{3}$ acre was planted to Common vetch at the rate of 60 lbs. The entire older orchard about one acre was planted to Purple vetch at the rate of 60 lbs. per acre. The ground was all irrigated before planting. Planting was made on October 23rd and 24th.

Mr. George Waite was secured as cooperator in El Cajon section. Mr. Waite's orchard is planted on decomposed granite soil with South and West slope. The trees are irrigated by furrow system and are planted 25 feet each way with rows 500 feet long. The following cover crops were used:

Common vetch at the rate of 60 lbs. per acre.
 Purple vetch 60 lbs.
 The Canadian field peas and barley at a rate of 50 lbs. of peas to 20 lbs. of barley.
 Canadian field peas alone 70 lbs.
 Small seeded Windsor beans 70 lbs.
 Melilotus indica 20 lbs., each plot contains .35 acre.

(4)

The orchard was irrigated before planting. Planting was made on October 16th with exception of the Windsor beans which were delayed until October 29th as we were not able to get the seed before that date.

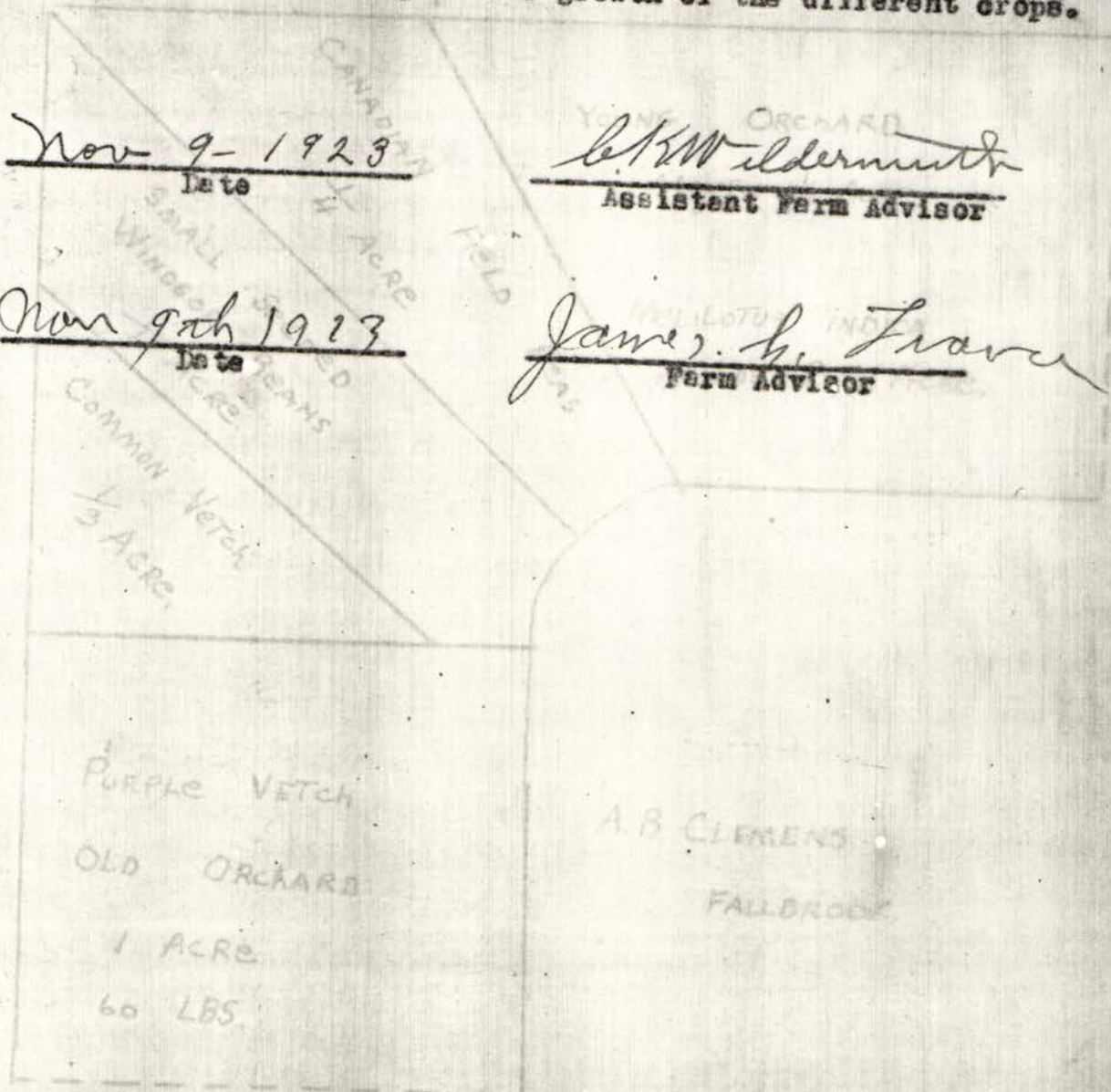
At Escondido the plantings were not all made in one orchard. All of the different cover crops outlined in the project are to be found in this section, and the cooperation of the growers has been secured, enabling us to use the various orchards to make a comparative growth of the different crops.

Nov 9-1923
Date

C. W. Wildermuth
Assistant Farm Advisor

Nov 9th 1923
Date

James H. Traver
Farm Advisor





Melilotus indica

XXXXXX

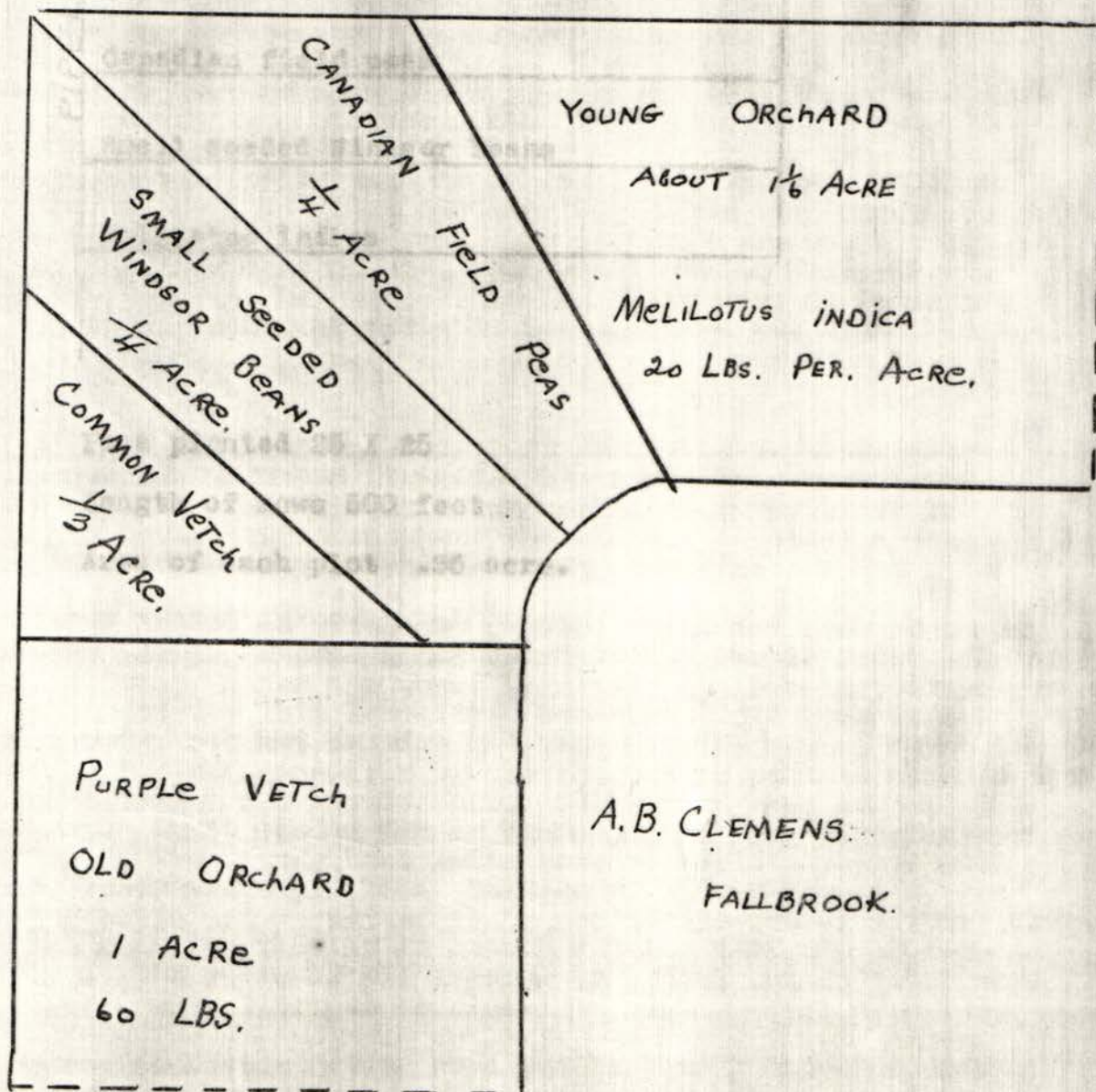
Common vetch

XXXXXX

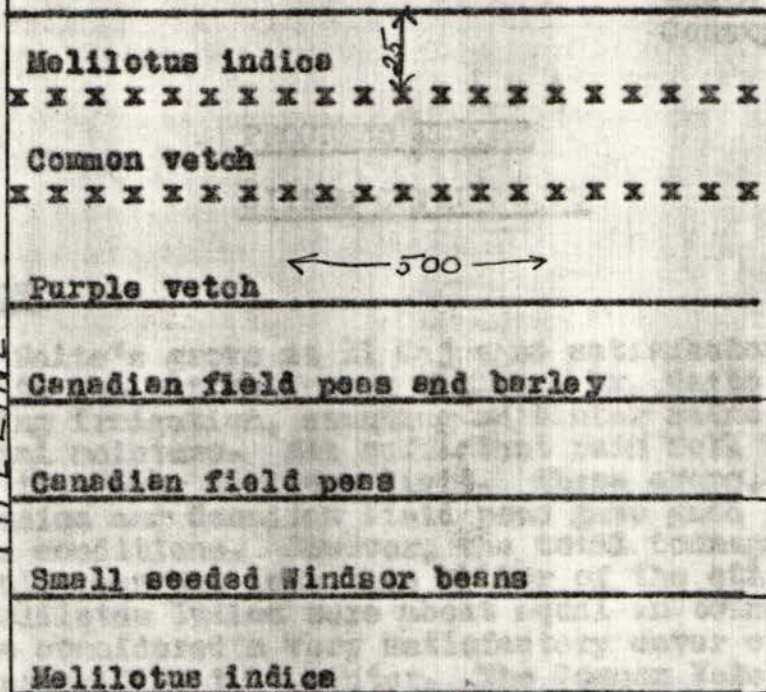
Purple vetch

XXXXXX

Canadian Field Peas



PIPELINE



Peas planted 25 X 25

Length of rows 500 feet

Area of each plot .35 acre.

Melilotus indicus an excellent growth, estimated from 15 to 25 tons per acre yield. Planted under March 10th. Purple Vetch was also planted. Either one would be a very satisfactory cover crop for this locality. Canadian field peas were a very good growth, but not as high a thrush as the above, but will it stand the tramping down by the vickers as well as does the Melilotus indicus and Purple Vetch. It also is very subject to mildew injury. Small seeded Windsor beans made a very satisfactory growth early in the spring, but later were so badly injured with blight as to be completely killed. One of the best of seed for planting would not permit of their profitable use as a cover crop. Common Vetch made probably no growth and was entirely useless as a cover crop. The rows of all legumes excepting Canadian field peas were thickly covered with Nitrogen bacteria.

In Sweeney's Doctor Nelson used Purple Vetch, Canadian peas and Melilotus as a cover crop. The vetch and the Melilotus were planted to Windsor beans.

FARM ADVISOR PROJECT:

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County 84

PROGRESS REPORT

CITRUS COVER CROPS

EL CAJON PLOT

On Mr. Waite's grove at El Cajon no satisfactory results were secured due to the extremely dry winter. Mr. Waite planted his cover crop following irrigation, counting on winter rains to furnish the additional moisture. Not sufficient rain fell to be of any benefit and the cover crop was light. Three crops, Purple Vetch, Melilotus Indica and Canadian Field peas gave good growth considering moisture conditions. However, the total tonnage of the Canadian Field peas was less than either of the other two. Purple Vetch and Melilotus Indica were about equal in tonnage. Neither one could be considered a very satisfactory cover crop under conditions prevailing this winter. The Common Vetch was a complete failure, making no growth at all. The small seeded Winsor beans started a good growth, but were killed by Aphis very early in the winter. Plots in this district will be continued the coming winter.

FALLBROOK PLOT

The plot on Mr. Clemmens's grove at Fallbrook was extremely satisfactory. Mr. Clemmens irrigates his grove by an overhead sprinkling system. When winter rains failed to materialize he irrigated his cover crop throughout the winter. A check of the crops the last of March gave the following results.

Melilotus Indica an excellent growth, estimated from 18 to 20 tons per acre yield. Plowed under March 18th. Purple Vetch same as Melilotus Indica. Either one would be a very satisfactory cover crop to recommend for this locality. Canadian Field peas made a very good growth, but not as high a tonnage as the above, nor will it stand the tramping down by the pickers as well as does the Melilotus Indica and Purple Vetch, it also is very subject to Mildew injury. Small seeded Winsor beans made a very satisfactory growth early in the winter, but later were so badly infested with Aphis as to be completely killed. Outside of this the cost of seed for planting would not permit of their profitable use as a cover crop. Common Vetch made practically no growth and was entirely useless as a cover crop. The roots of all legumes excepting Common Vetch were thickly covered with Nitrogen Nodules.

In Escondido Doctor Matsen used Purple Vetch, Canadian peas and Melilotus as a cover crop. Mr. Matsen had his entire grove planted to Winsor beans.

Purple Vetch, Canadian Field peas and Melilotus all gave satisfactory growth. But due to the fact that pickers tramping through the orchard injured the Canadian peas to a much greater extent than they do Vetch and Melilotus these two were considered the preferable crop to grow. In this section as on the other two plots the value of Winsor beans was destroyed by Aphis injury. This together with high cost of seed would prohibit its use as a cover crop.

Results of all these localities would favor Melilotus Indica or Purple Vetch as a very satisfactory cover crop for San Diego County conditions with practically no difference between the two crops.

Date

Assistant Farm Advisor

March 1925

Date

Farm Advisor

COOPERATIVE EXTENSION WORK
UNIVERSITY OF CALIFORNIA
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THE BOARD OF SUPERVISORS OF SAN DIEGO COUNTY, CALIFORNIA

- I. NAME OF PROJECT: Citrus cover crops for San Diego County.
- II. DATE EFFECTIVE: August 1st, 1924.
- III. STATUS OF PROJECT: Work done in 1924.

Cover crop test plots were carried on at Fallbrook, Escondido and El Cajon during the winters of 1923 and 1924.

For detailed report of the results of these plots see progress report of 1924.

- IV. GOALS FOR 1925:
1. Establish two cover crop test plots
 2. Secure yield records

V. PROCEDURE:

(1) Procedure -- Subject matter.

Various crops, that have been recommended as successful cover crops in different sections of the citrus belt, were the ones used for carrying on these tests.

(2) Procedure -- Extension methods.

1. Establish two test plots of the crops showing most satisfactory results in 1924.

2. Secure comparative yield records of these crops

(3) Procedure -- Calendar for 1924.- 1925.

When	What	Who
August	Secure cooperators	Farm Advisor
September and October	Plant cover crop	Farm Advisor and Cooperators

When	What	Who
November	Observe growth	Farm Advisor
January	Observe growth	Farm Advisor
February	Secure yield records	Farm Advisor

Date

MAR 31 1925

B. H. C. C. C. C.
Extension Director

Date

Mar 31 1925

W. R. Schoonover
Extension Specialist

Date

March 26 - 1925

Le M. W. Alder
Assistant Farm Advisor

Date

March 26 - 1925

James H. France
Farm Advisor

February 7, 1927.

Name of Project **PROGRESS REPORT****CITRUS COVER CROPS**

As stated in last year's Progress Report, no project work was carried on this year. Work was confined to a campaign for an increased use of cover crops in the citrus sections of the county. Cover crop test plots were established on F. M. Barton Ranch, El Cajon, Dr. N. Matzen, Escondido and A. B. Clemens, Fallbrook.

The crops used in each case were Melolotus Indica and Purple Vetch. In previous tests they have proven most satisfactory for this section.

On the F. M. Barton Ranch at El Cajon very little irrigating was done, and as a result only a small tonnage was secured due to an extremely dry winter. The yield was estimated at around six tons per acre for each crop.

On Dr. Matzen's place in Escondido liberal irrigation was given and heavy cover crops were grown, a check of yields showing approximately fifteen tons per acre.

At Fallbrook on Mr. Clemens' place the best results were secured. Mr. Clemens irrigates his grove with overhead sprinklers which in this section has proven ideal for growing a good cover crop. Plowing was done the last of February when a check of yields showed approximately twenty tons per acre. Very little difference was shown between the two varieties of cover crops grown and a choice depends upon the topography of the orchard and choice of the grower. Where an orchard is planted on a steep slope Melolotus is often preferred as it grows much thicker on the ground and naturally decreases washing during rainy seasons.

This work will not again be carried as a test plot project as the past three years shows very conclusively that both crops are well adapted to our citrus sections and all work will be confined to a campaign for increased growing of cover crops throughout the county.

Feb 15th 1926

Date

Feb 15th 1926LeW. Wilder
Assistant Farm AdvisorJan 11th 1927
Farm Advisor

Advisor Project

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Project Number
State Leader No. 1879
County No. 84

Progress Report

Date: February 7, 1927. AGRICULTURAL EXTENSION SERVICE

UNIVERSITY OF CALIFORNIA

PROGRESS REPORT

Name of Project: Citrus Cover Crops.

County of San Diego

Date October 22, 1927

State No. 1879

County No. 84

As stated in last years Progress Report, no project work was carried on this year. Work was confined to a campaign for an increased use of cover crops in the citrus orchards of the county. Cover crops are at present grown in at least 80% of the citrus orchards in the county, and Melilotus Indica and Purple Vetch are the two crops almost exclusively used. With this practice so well established, no further project work seems desirable. This project is completed and filed.

L. E. Wildermuth
Assistant Farm Advisor

James G. Frame
Farm Advisor