

whole it shows that fumigation and heat sterilization are safe practices both for grains and legumes at the dosages commonly used and with proper precautions as to the length of exposure and ventilation afterwards.

GERMINATION PERCENTAGE OF BEANS AFTER TREATMENT WITH EXCESSIVE DOSAGE

Variety	Heat	Heat	Heat	Cyanide	Cyanide	CS ₂	CS ₂	Aver.	Ck.
	Temp. 100-155° F.	Temp. ¹ 124-154° F.	Temp. 125° F.	4 oz. to 100 cu. ft.	2 oz. to 100 cu. ft.	40 lbs. per 1,000 cu. ft.	30 lbs. per 1,000 cu. ft.		
	Time 5 hrs.	2 hrs.	8 hrs.	18 hrs.	5 hrs.	18 hrs.	42 hrs.		
Large Horse.....	(1) 97	(2) 94	(3) 88	(4) 100	(5) 98	(6) 96	(7) 73	91	100
Lady Washington.....	96	98	98	85	97	100	96	96	99
Bayo.....	96	100	96	95	100	96	100	97	100
White Tepary.....	100	39	98	97	88	95	98	88	89
Red Kidney.....	97	89	98	100	100	98	100	99	98
Red Mexican.....	68	99	100	100	100	100	98	95	99
Cranberry.....	81	97	90	100	97	97	100	95	99
Henderson Bush.....									
Lima.....	22	96	96	87	100	93	80	79	94
Garbanzo.....	96	65	76	75	100	72	100	83	94
Blackeye.....	94	94	95	97	72	96	93	91	93
Pink.....	100	96	99	90	100	100	100	98	99
Series averages....	86	88	94	93	96	95	95	92	97
Excess in time or strength used above.....	10x at this Temp.	6x at this Temp.	1.6x at this Temp.	8x strength 18x time	4x strength 5x time	8x strength	6x strength 2x time		

¹ Temp. readings for series 2 are as follows: 10.45 a. m., 102° F., 1.30, 136° F., 3.45, 154° C.

ON THE ABSENCE OF INSECT PESTS IN CERTAIN LOCALITIES AND ON CERTAIN PLANTS¹

By T. D. A. COCKERELL, *University of Colorado*

The reports of entomologists describe the ravages of insect pests where they occur, but are usually silent concerning the *absence* of infestation. In these days, when we are so greatly concerned to increase the available food-supply, it seems particularly important to ascertain where crops can be grown with the least danger from insect attack. My wife and I, having a "war-garden" in Boulder, Colorado, in 1918, gained some experience which may be worth relating. Our beans (*Phaseolus*) were completely overrun by *Epilachna corrupta*. It was thought that assiduous hand picking early in the season would abate the plague. It doubtless helped, and we got a good many beans; but the beetles came flying to the patch every

¹ This paper should have appeared with those read by title at the Baltimore meeting.—ED.

day, and eventually the plants were ruined. Experiments made at the Colorado Agricultural College not yet published, indicate that kerosene emulsion may be used with success against this insect, but it is impossible to get it applied uniformly over a town full of little bean-patches in back yards. It seems practically impossible to prevent numerous persons from raising enough bean-beetles to replenish the neighborhood. Now this *Epilachna*, for reasons not clearly understood, is of very restricted distribution. It abounds in the vicinity of the mountains, from northern Colorado to southern New Mexico. A short distance out on the plains it apparently ceases to be a serious pest. It eats only *Phaseolus*, so far as I can find; soy beans and other beans of different genera are untouched. It probably feeds on no wild plant in the vicinity of Boulder. By entirely omitting the cultivation of beans for a year or more, it could presumably be starved out, and subsequently beans could be grown with safety. In the immediate future, however, it is obviously indicated that beans should be grown in those localities where the *Epilachna* is absent or a very minor pest, and that in the *Epilachna* area the ground should be given to other crops.

Our experience with tomatoes has been very different. We got an early variety from Burbank, and the crop of the three varieties grown has been enormous. The season has been favorable, and up to the date of writing (October 11) the crop has been continuous, owing to the absence of frost. There have been no significant insect pests. Toward the end of summer, as we had observed for many years past, *Heliothis obsoleta* is very abundant in Boulder. I have observed it as early as July 27. I had thoughtlessly assumed that all these moths were of local origin, but it is now evident that they migrate from the south. Our tomatoes have been entirely free from the attacks of the larvæ, and our corn has been practically free, showing only light and negligible infestation toward the end of the season.

The tomato is not only edible as such, raw and cooked, but it may be made the basis of excellent jam. Mrs. Cockerell finds that it is possible to reduce the usual amount of sugar in the jam to a fourth, replacing the rest by commercial syrup. By increasing the acreage of tomatoes, in the region where these are not seriously injured by insects, it is possible to produce a great amount of food, much of which may be put up in the form of jam and preserves. It would, therefore, seem to be a very important function of the Entomologists to ascertain and designate the regions where tomatoes may thus be grown to the greatest advantage. It may mean the addition of hundreds of tons of food to our supplies in a single season. As with tomatoes, so with other crops. The everbearing strawberry has been a delightful sur-

prise to us in Boulder. As I write there stands before me a basket of strawberries, gathered today (October 11) by a neighbor. This plant, also, seems to have no important pests in this locality; or at any rate, it produces abundantly without any special treatment. We are probably in an optimum region for strawberries as well as tomatoes.

The girasole or Jerusalem artichoke (*Helianthus tuberosus*), of which we have a large experimental plot, is practically immune from insect or fungus attack, at least with us. Early in the season the young plants were attacked by cutworms, and it seemed that there would be some loss. But one shoot cut off, another came from a different "eye," and I believe that ultimately I did not lose a single plant.

Asparagus has been free from pests in our garden until recent years. The European asparagus beetle has now arrived and is very abundant. We have taken out most of the asparagus and replaced it by strawberries.

At this time of year it would be possible by sending out circular letters in sufficient numbers, to ascertain the optimum regions for different crops, taking into account insect and fungus attacks, soil and climate. Maps could be prepared showing these areas, with shading to indicate the minor variations. In this way, so far as one-season crops are concerned, it is possible that if the results were sufficiently widely advertised, a notable increase in production would result.

SOME RECENTLY RECORDED PARASITES OF THE ORIENTAL PEACH MOTH

By LOUIS A. STEARNS, *Associate Entomologist, Virginia State Crop Pest Commission*

While making a preliminary canvass during the summer months of 1918, to determine the exact status of the Oriental Peach Moth (*Laspeyresia molesta* Busck) in Virginia, and to collect desirable data concerning the injury resulting from the feeding habits of this pest,¹ an accompanying study of its life history was carried on at the north Virginia field laboratory, Leesburg. Of more than six hundred larvæ collected from injured peach twigs and fruits in nearby infested orchards at different dates from mid-July until late September, and placed in vials for daily observations as to development, a large number were parasitized. During the latter part of this period, parasitism of larvæ and pupæ continued at an average of 35 per cent. Numbers

¹ "The Oriental Fruit Moth In Virginia"—Quarterly Bulletin, Va. State Crop Pest Commission, April, 1919.