

THE TOLL OF WEEDS IN INDIANA.<sup>1</sup>

ALBERT A. HANSEN.

The early settlers in Indiana encountered little difficulty with the weed problem, since few of our native plants are serious weeds. As the land became more settled troublesome weeds began to appear, most of them being European plants that were introduced in impure seed. Since the earliest days of Indiana agriculture, the weed problem has increased in seriousness until at the present time the loss due to the presence of weeds is enormous. Before the weed problem can be solved in Indiana, the farmers themselves must understand and appreciate the seriousness of the situation. An understanding and appreciation of this character can perhaps be secured by a knowledge of the various ways in which weeds cause loss and the amount of damage done.

The extent of the damage caused by weeds is not ordinarily realized. The presence of weeds has been accepted as inevitable and the tendency has been to ignore them. It is hoped that the estimates here presented will not only call attention to the different ways by which weeds cause damage, but that they will also be of value in creating a realization of the importance of the problem. It is a subject that is of importance to all citizens of the state since the welfare of Indiana is largely dependent on agricultural prosperity and the control of weeds is an important factor in profitable agriculture.

The figures herein considered are based on production during the year 1920, even though 1920 can hardly be considered a normal agricultural year. The values of the various farm crops were obtained from the "Year Book of the State of Indiana, 1920."

The final estimate does not include such considerations as the damage to health caused by hay-fever weeds, etc., the losses caused by weeds harboring harmful insects and plant diseases, the esthetic loss, and the reduction in the value of property due to the presence of weeds. On the other hand, the valuable features of weeds such as the value of the organic matter they supply and the prevention of soil washing, are not considered since even approximate estimates of this character are practically impossible to obtain. In preparing the estimates, assistance was obtained from a number of specialists who have devoted many years to the study of Indiana agriculture.

*Tillage Loss Due to Weeds*—The figures relative to the tillage loss occasioned in cultivated crops are based on work performed in the office of Farm Management, U. S. D. A., demonstrating that cultivation costs about one-sixth of the total value of a farm crop. It is estimated conservatively that one-half of the cost of cultivation is due to the presence of weeds.

<sup>1</sup> Contribution from the Botanical Department (Extension Division) of the Purdue University Agricultural Experiment Station.

<i>Crop</i>	<i>Value, 1920</i>
Corn .....	\$119,647,000
Potatoes .....	8,448,000
Sweet Potatoes .....	396,000
Tobacco .....	2,160,000
Onions .....	1,456,000
Sorghum (unofficial estimate).....	738,000
Cabbage .....	114,000
Broom corn .....	17,000
Dry beans .....	91,000
Soy beans (based on 80% of crop cultivated).....	97,600
Cowpeas (based on 40% of crop cultivated).....	100,800

Total value of tilled crops in Indiana (1920).....	\$133,265,400
One-sixth of total value (cost of cultivation).....	\$22,210,900
Tillage loss (one-half of cost of cultivation).....	11,105,450

*Loss Due to Reduced Crop Yields Caused by Weeds*—The presence of weeds has been estimated to reduce the yield of corn 10 per cent; tame hay, 3 to 16 per cent; potatoes, 6 to 10 per cent; spring grain, 12 to 15 per cent; and winter grain, 5 to 9 per cent.<sup>1</sup> The total value of farm crops in Indiana during 1920 was \$274,150,000. Assuming that the presence of weeds caused a 10 per cent reduction of crop yields, the loss would be \$27,415,000.

*Discount Losses*—The presence of weed seeds in small grains is estimated to cause an average discount of 1 per cent. The discount may be considered as a measure of the damage due to the presence of the weed seeds. The total value of wheat, oats, barley, and rye during 1920 was \$80,272,000, hence the discount loss in these crops was \$802,720.

The discount loss caused by weed seeds in clover seed is estimated at 10 per cent. The value of the clover seed crop in 1920 was \$1,392,000, hence the discount loss was \$139,200. Figures are not available for the value of the grass seed crop during 1920.

The presence of weeds in hay is estimated to cause a discount of 5 per cent. The total value of the 1920 tame hay crop was \$49,060,000, consequently the loss was \$2,453,000.

The total discount loss can then be figured:

Small grains .....	\$802,720
Clover .....	139,200
Hay .....	2,453,000
	<hr/>
	\$3,394,920

*Loss Due to Land Rendered Incapable of Profitable Cultivation*—The presence of the Canada thistle, wild garlic and other noxious perennial weeds has made certain areas incapable of profitable cultivation. Although the amount of land abandoned to weeds is not large in Indiana, it is a factor worthy of consideration. Land of this character occurs for the most part as small areas on a number of farms. The

<sup>1</sup> Cates, H. R.—"The Weed Problem in American Agriculture." Separate from year-book of the Department of Agriculture, 1917, No. 732, p. 3.

total loss from this source is estimated at \$100,000. In this connection, it should be remembered that certain otherwise profitable crops cannot be grown on weedy land.

*Railroad Weeds*—A few years ago the writer obtained estimates of the cost of destroying weeds on the right of way of the principal railroads in the United States. The estimates ranged from \$10 to \$60 per mile per year. Assuming that it costs \$10 per mile per year to destroy the railroad weeds in Indiana, the total annual cost for 15,000 miles of track (both steam and electric railroads) will be approximately \$150,000.

*Turf Weeds*—The damage due to the presence of weeds in lawns is extremely difficult to estimate. Assuming the damage at \$2 per lawn per year, the total will be about \$200,000. To this should be added the cost of weeding golf courses and miscellaneous turfs.

*Roadside Weeds*—The time devoted to cutting roadside weeds can be conservatively estimated at one day of labor per farm per year. If but one-fourth of the farmers devote even this small amount of time to their roadside weeds, it will amount to 52,500 days on the 210,000 farms of Indiana. At \$3 per day for a man and team, the bill for cutting roadside weeds will amount to \$157,500 per year.

*Pasture Weeds, Waste Place Weeds, Etc.*—The estimated annual cost per farm of clipping stubble land, mowing weedy pastures and cutting waste place weeds is \$5 per year. For 210,000 farms the total is \$1,050,000.

*Miscellaneous Losses*—Among the miscellaneous losses may be included the loss from poison plants, damage to milled products caused by wild garlic and similar weeds, damage to dairy products due to wild garlic, bitterweed, etc., and the loss occasioned by mechanically injurious weeds, such as the fruits of buffalo bur, *Solanum rostratum*, the awns of grasses such as squirrel tail grass, *Hordeum jubatum*, etc. The miscellaneous losses are estimated at \$500,000 per year.

#### ESTIMATED TOTAL WEED LOSS IN INDIANA (1920).

Estimated tillage loss .....	\$11,105,450
Estimated loss due to reduced yields.....	27,415,000
Estimated discount losses .....	3,394,920
Estimated loss due to land rendered incapable of profitable cultivation .....	100,000
Estimated cost of clearing weeds from railroad rights of way .....	150,000
Estimated damage by turf weeds.....	200,000
Estimated cost of cutting roadside weeds.....	157,000
Estimated cost of cutting pasture weeds, waste-place weeds, etc. ....	1,050,000
Estimated miscellaneous loss .....	500,000

Grand total ..... \$44,072,870  
or approximately \$14 per capita per year.

#### *What Are We Going to Do About It?*

The grand total of forty million dollars' loss caused by weeds in a single year in Indiana, is probably very conservative. Cut the esti-

mate into half, and the loss is still enormous. Although it is readily conceded that the estimates are far from accurate, nevertheless the startling figures obtained are thought to be as nearly correct as it is reasonably possible to estimate. The staggering loss attributed to weeds should cause us to pause and think more seriously of the weed problem than has been our custom.

The question naturally arises, what are we going to do about it? The following suggestions are offered as possible aids in the solution of this vast problem:

1. The use of clean, pure, viable seed is fundamental in the control of weeds. Unless pure seed is used, all other efforts to cleanse our fields will be of little avail. Good seed will solve the problem to a large extent. In this connection, the recent seed law, which will be actively enforced on and after January 1, 1922, is of great importance, since it will enable the farmer to know the viability and purity of all agricultural seed purchased from dealers. The law provides that agricultural seed offered for sale in Indiana shall be labeled, the label to state: (a) the name of the kind and variety of seed, (b) the minimum number of seeds per pound of certain weeds designated as noxious that are present in seed offered for sale, (c) the place of origin of the seed and (f) the name and address of the vendor.

2. The importance of killing weeds before they mature seeds can hardly be over-emphasized. The destruction of seedling weeds is not difficult, but when weeds are allowed to mature seeds the difficulties are multiplied manifold. Weed seeds may remain viable in the soil for a number of years, a constant menace to future crops. The mowing of pastures before the weeds mature seeds will gradually drive the weeds out and permit the pasture plants to come in. The thorough preparation of the seed bed is also very important, since thousands of weed seedlings are destroyed by this means. Again, it pays to cut a weedy hay crop early, before the weeds have had a chance to mature seeds.

3. The results of recent experiments indicate strongly that after the preparation of the seed bed, the principal, if not the only, object of cultivation is the destruction of weeds. The more general use of the sweep or knife type of cultivating implements in soils adapted to their use will aid in solving the weed problem in tilled crops. This is particularly true in corn that is planted in check rows.

4. Roadsides, fence rows and waste places generally are centers from which surrounding farm land is constantly being infested with weeds. The roadside and fence-row weeds should be mowed on June 15th and again on August 15th. The more general use of the spud and hoe against waste-place weeds is much to be desired.

5. The threshing machine is a common and efficient carrier of weeds from farm to farm. The thresher should be thoroughly cleaned after each operation.

6. Sheep are excellent weed eradicators. It is highly profitable to turn weeds into mutton and wool. A few sheep on every farm in Indiana will help materially in solving the weed problem.

7. Give the land a chance to grow profitable crops. Maintain fertility by the use of lime and the addition of organic matter and

fertilizers and drain where necessary. A luxuriant growth of pasture or turf grasses, for instance, will crowd out the weeds.

8. Many grain-field weeds can be controlled by the use of a weeder or a spike-tooth harrow in the young grain, a practice that is usually more profitable than the use of sprays and other spectacular devices.

9. Clean cultivation, crop rotation, and the use of smother crops will eradicate or control the incidental weeds. A few weeds, such as the wild garlic, Canada thistle and dodder must be dealt with by special methods.

10. Co-operation among farmers is an important factor in weed control, inasmuch as weeds are a community as well as an individual problem. Many weeds, for instance, are disseminated by wind-distributed seeds. It avails a man little to eradicate the Canada thistle on his farm if the seeds from a neighbor's land are allowed to reinfest the clean fields. Roadside weeds in particular present a problem that can be solved by concerted action only. A realization of the seriousness of the situation should arouse sentiment in favor of co-operative action.

Purdue University.

