

A WEED SEED PROBLEM

in

IRRIGATION

By E. A. Helgeson

AS irrigation comes to North Dakota, farmers will be faced with problems of weed control due to the spread of weed seeds in irrigation waters.

Water may be a major source of weed seed spread for many common weeds growing in this state.

Preliminary laboratory studies show that, assuming a stream flow of 1 mile per hour, many seeds can travel a distance of 24 miles in a ditch or stream. At 3 miles per hour, they can travel 72 miles.

Some of these seeds have special structures which enable them to float for considerable periods of time. Waxy coverings, light corky coverings, hairy coats and pods, or other attached structures provided with air chambers, are modifications which increase their floating characteristics.

While some work on this problem has been done in other states, no extensive data are available for North Dakota.

Several years ago a study of this problem was started by the botany department. Some study was made of the distribution of weeds along the newly impounded Garrison dam and Baldhill waters as well as in the areas which offer potential lands for irrigation. This report deals with another important phase of weed spread; namely, the capacity of some of our native weed seeds to float and move in flowing water.

Seeds of a considerable number of weeds common in areas of potential irrigation were collected the past summer and fall. These were carefully threshed and 100-seed lots were counted out. The seeds were then dropped a distance of 5 feet through a ½-inch glass tube so as to fall upon the surface of tap water in glass containers. This approximates the distance seeds would fall from weeds overhanging a ditch bank or waterway.

The number of seeds afloat after 24 hours was recorded. At the end of this period the con-

E. A. HELGESON is botanist at the North Dakota Agricultural Experiment Station and chairman of the department of botany, NDAC.
Progress Report, Project S-9-1

tainers were gently shaken for a period of 3½ hours to simulate wave action, and the seeds still floating were again counted.

In some instances both actual seeds and seeds with attached flower or fruit parts were tested. All samples marked with a double star in the table had such additional parts.

Referring to the accompanying table it is interesting to note that with simulated wave action seeds such as pigeongrass, bull thistle, stinkgrass and Frenchweed sank more readily than when on quiet water. On the contrary, seeds of other sorts, including sow thistle, marsh elder and gumweed, were relatively unaffected. Some of our most serious weeds such as barnyard grass, the docks, Frenchweed, kochia, leafy spurge, mustard, Russian knapweed and the various thistles had extremely high capacities for floating.

Weed seed traps floating on the surface of water in drainage ditches near Fargo have given us catches of many of the above seeds. Samples of mud from these same ditches have shown a relative abundance of practically all seeds listed in the table plus many others.

Further studies are in progress to determine the longevity of seeds in ditch water or bottom deposits and also the plant producing potential of these. Chemical and other methods of

ditch bank control are also receiving attention.

An added point of interest was the germination of seeds of Russian thistle, curled dock, kochia, mustard and wormwood in amounts of 24 percent or more. Nine other types also germinated in fewer numbers. These were floating or submerged in water for 31 hours.

This points out that many weed seeds start to germinate as they float along and are thus ready to start growth when lodged on suitable soil.

TABLE I.—**Floating Ability of Some North Dakota Weed Seeds.**

The numbers indicate the percentage of seeds still floating after the time periods listed below had elapsed.

Plant	Quiet water	Disturbed water*
Artichoke	97	97
Barnyard grass	100	93
Dock, curled	57	52
Dock, curled**	100	100
Dock, willowleaf	62	58
Dock, willowleaf**	100	100
Frenchweed	94	62
Gumweed	99	96
Kinghead**	99	49
Kochia	50	37
Kochia**	97	51
Lead plant	15	14
Lead plant**	97	79
Leafy spurge	81	60
Marsh elder	100	99
Marsh elder**	100	87
Mustard, common	75	71
Pigeongrass, green	54	29
Pigeongrass, yellow	61	32
Pigweed	84	78
Russian knapweed	97	72
Stinkgrass	83	12
Thistle, bull	43	10
Thistle, Canada	98	87
Thistle, Russian	100	88
Thistle, sow	99	99
Wild oats	55	43

*Quiet water 24 hours, shaken 3½ hours.
 **These had hulls or flower parts attached.