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# The Wild Onion

University of Tennessee Agricultural Experiment Station

# UNIVERSITY OF TENNESSEE

## Agricultural Experiment Station

## BULLETIN

VOL. VIII. JULY, 1895. No. 2.

# THE WILD ONION.

Bulletins of this Station will be sent, upon application, free of charge, to any Farmer in the State.

KNOXVILLE, TENNESSEE, U. S. A.

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# THE AGRICULTURAL EXPERIMENT STATION

## OF THE UNIVERSITY OF TENNESSEE.



The Station has facilities for analyzing and testing fertilizers, cattle foods, milk and dairy products; seeds, with reference to their purity or germinating power; for identifying grasses and weeds, and studying forage plants; for investigating the diseases of fruits and fruit trees, grains and other useful plants.

The Station Bulletins and Reports will be sent, free of charge, to any farmer within the State.

Packages by express, to receive attention, should be *prepaid*.

All communications should be addressed to the

SECRETARY OF THE
AGRICULTURAL EXPERIMENT STATION,
KNOXVILLE, TENN.

☞ The Experiment Station building, containing its offices, laboratories and museum, and the plant-house and horticultural department, are located on the University grounds, fifteen minutes walk from the Custom House in Knoxville. The Experiment farm, stables, milk laboratory, etc., are located one mile west of the University, on the Kingston pike. Farmers are cordially invited to visit the buildings and experimental grounds.


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*Died, May 12th, 1895.

# HORTICULTURAL DIVISION.

## ALLIUM VINEALE, L.

R. L. WATTS.

The Wild Onion (*Allium vineale, L.*), also known as Field Garlic, Crow Garlic and Crow Allium, is considered by many the vilest weed pest common to our State. It is a frequent occurrence for the Experiment Station to receive letters from farmers relative to this pernicious weed. Complaints are made as to the trouble which it gives in dairying, and information is eagerly sought as to how it may be successfully combated.

Our design in publishing a Bulletin on the Wild Onion is three fold: 1st, to furnish an illustrated description, which will enable those whose farms are not yet infested to recognize the plant should it be introduced into their neighborhood; 2nd, to serve as a danger signal against this weed which is so rapidly spreading throughout the state; 3rd, to offer a few suggestions as to methods of combating it.

### BOTANICAL DESCRIPTION.

The scape or stem is slender, one to two feet high, round, smooth, clothed with three sheaths from about the middle down; leaves are very long on mature plants, terete, hollow, slender and channeled above. Peduncles bearing the flowers are produced late in the season when the aerial bulblets are well matured. The peduncles, which vary greatly in number, grow out from between the bulblets of the heads. Flowers are small; the six petals rose colored and green; filaments of the stamens much dilated, the alternate ones three-cleft, the middle division anther-bearing. Each of the three cells contains one or two seeds.

The root is composed of from three to seven white bulbs varying from one-eighth to one-half inch in diameter. The central one is usually the largest, and the bulbs are separated from one another by the thin membranous bases of the leaves. They are flattened on one side when pressed closely to the parent bulb.

The stems bear from one to four globes. One globe is most commonly found, very frequently two, sometimes three and occasionally four. The globes contain from twenty-five to one hundred and fifty

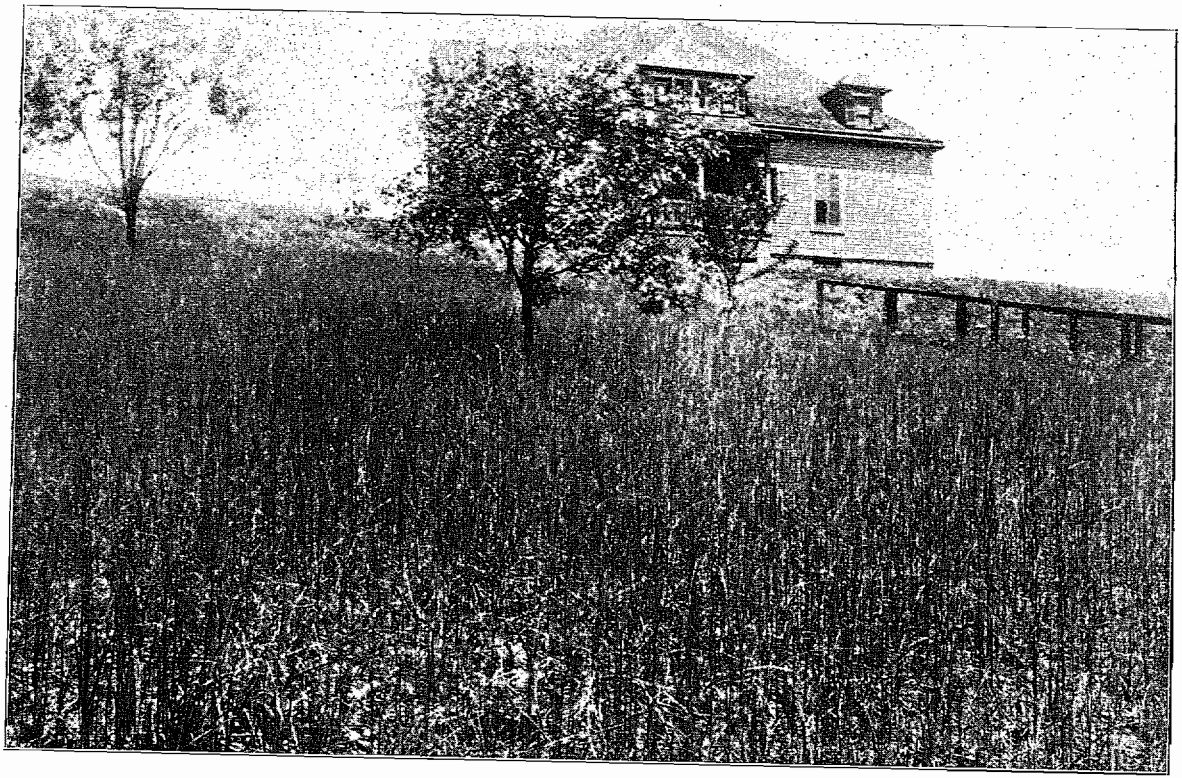

FIG. 1.—Wild Onions in the Experiment Station Orchard.

bulblets. These are acuminate and recurved, frequently germinating or crinite, as Fig. 4 shows, purplish in color at the apex, gradually passing into white at the base.

All parts of the plant are very strong-scented and pungent.

## DISTRIBUTION.

The Wild Onion is a native of Germany, Switzerland and Italy; found in cultivated places over the greater part of Europe, and extends far into Scandinavia. (Muller.)

It has doubtless been brought to this country at different times and in various ways. A company of Welsh immigrants is said to have introduced it into eastern Pennsylvania. We have also known the aerial bulblets to be imported in wheat, by which method it has probably been most widely disseminated.

Not long since letters were sent to the botanists or horticulturists of several eastern and southern experiment stations relative to the prevalence of this baneful weed. We desire to thank those who have thus kindly assisted us, and the following extracts from their communications will doubtless prove of interest and value to our readers.

NEW JERSEY.—Byron D. Halstead, Botanist.—The Wild Onion (*Allium vineale, L.*) is very abundant and is one of our worst weeds, especially in spring when it taints the milk of cows.

MARYLAND.—James S. Robison, Horticulturist.—The Wild Onion is widely distributed over our state and is recognized as a veritable pest, one of the worst, giving trouble in the grain fields, and is an abomination to our dairy people, making it necessary to keep the stock up when they might have the advantage of the pastures. I know of a field in this locality that has been annually cropped for ten years and left this year in fallow to find it covered with Wild Onions. I think we have the plant to perfection.

VIRGINIA.—Prof. William B. Alwood.—The Wild Onion is one of our very worst pests. It is present and very persistent over all Virginia east of the Blue Ridge, and more or less present in restricted localities throughout the remainder of the state. I cannot give you any just estimate of its injury to agriculture, but it is very great.

NORTH CAROLINA.—Gerald McCarthy, Botanist.—The Wild Onion is somewhat common in moist pastures, and we have found it a troublesome intruder in the plats on our Experiment Farm here near Raleigh. I have, however, seen it much more abundant farther northward than in this state. It is as yet not included among our twenty worst weeds, nor is it likely to be for many years.

SOUTH CAROLINA.—J. F. C. DuPre, Horticulturist.—The Wild Onion is distributed all over our state, but is mostly confined to the low lands

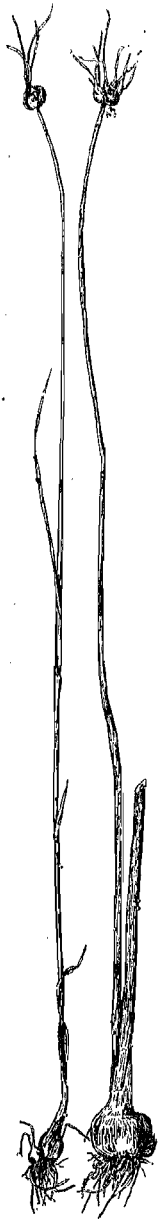

FIG. 2.
Mature plants,
one-fourth size.

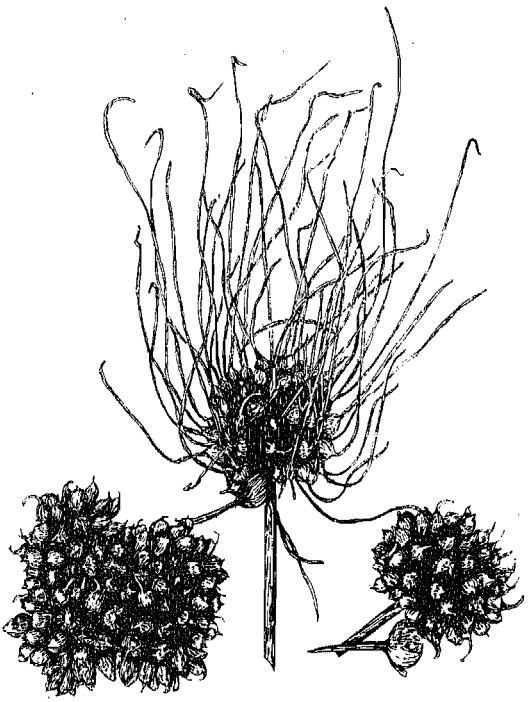

FIG. 3.—Heads containing the bulblets.

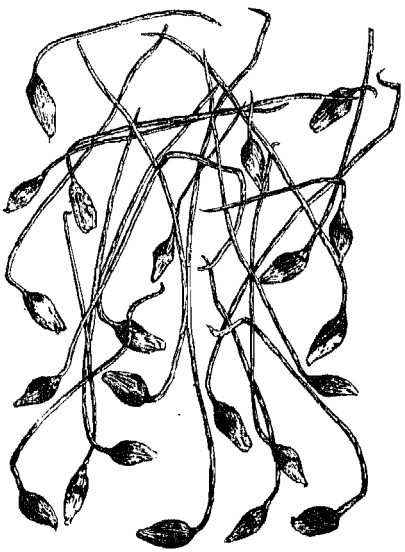

FIG 4.—Germinating bulblets.

along streams. It seems to be comparatively harmless as a weed; that is, it does not perceptibly injure the growth of any crop, but being freely eaten by cattle, it ruins the milk, butter and beef. What little wheat is grown in our state is raised on the uplands, and in that way kept free from this pest. There has been no special effort made to exterminate it, and it would seem to be an almost hopeless task.

GEORGIA.—H. N. Starnes, Horticulturist.—So far as my observation has extended the Wild Onion is confined very closely to North Georgia, especially to the region north of the Chattahoochee River. There are none whatever in this (Spalding county), and practically none in middle and south Georgia. It does not like a poor soil. For this reason it is especially prevalent in pastures since they fulfill the necessary conditions,—that is, our good land that has been in cultivation and subsequently turned out. It is also frequently met with in orchards.

TEXAS.—R. N. Price, Horticulturist.—I have not noticed *Allium vineale, L.* this far South. The *Allium striatum* occurs very abundant here; in fact, it is so prevalent as to do great injury to pastures for milk cows.

## DISTRIBUTION IN TENNESSEE.

The Wild Onion is widely distributed throughout our own state. It is found along almost every brook, creek and river in greater or less abundance, and the pest is rapidly making its way to the more hilly and mountainous regions. We have seen it in great profusion in some localities. (The illustration on page 28 shows how luxuriantly the Wild Onion grows in some soils. It is here we are conducting our experiments).

## VILENESS.

Much has already been said in this paper concerning the vileness of the Wild Onion. Many of our dairymen have become discouraged because of the trouble that this weed has given. It is well known among all farmers, whose places are infested with the pest, that when the cows feed upon it their milk and butter are ruined by the disagreeable taint which is derived therefrom. Thousands of acres of excellent land in Tennessee have been rendered worthless for the pasturage of milk cows. These lands are usually the best for the production of grasses, and therefore for dairy purposes, because they are frequently located along streams, the soils of which are moist and fertile. Unfortunately these same conditions are most favorable for the growth of Wild Onions. The flesh of the cattle also partakes of the unpleasant flavor; but this is not such a serious matter since the stock need not be killed while feeding on such pastures.

The injurious effect has also been serious to our wheat crop. When

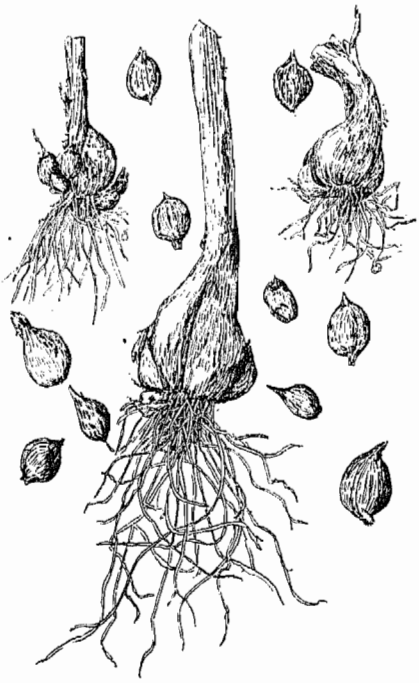

FIG. 5.—A collection of underground bulbs.

FIG. 6.—Bulbs formed in one year's growth from the parent bulbs.

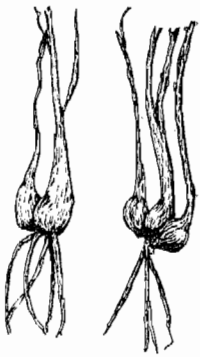

FIG. 7.—Seedlings a few months old.

even a small quantity of the aerial bulblets are harvested with the grain, threshed and ground into flour, the bread made therefrom will be tainted to such a degree as to be unfit for the table. In our own state, wheat containing Wild Onion bulblets has been sold as low as fifteen cents per bushel to feed stock.

We have no figures estimating the annual loss which our State sustains on account of the Wild Onion, but it must be very great. We do not hesitate to assert that it is our worst, most dangerous and troublesome weed enemy.

## METHODS OF PROPAGATION.

The Wild Onion is propagated by three natural methods, namely, seeds, aerial bulblets, and underground bulbs.

Each flower produces from three to six seeds. A globe usually contains about six flowers, making a total of at least eighteen seeds to each globe or plant. By actual testing we have found nearly a hundred per cent. of the seed to grow. These figures show at a glance the rapidity with which this weed may be propagated by seed. Each seed planted produced from three to seven underground bulbs in one year's growth. See Fig. 3.

It has been stated on another page that the globes contain twenty-five to one hundred and fifty bulblets. One hundred per cent. of those planted, both in the greenhouse and in the field, rooted and made a vigorous growth. Ninety per cent. of even quite immature bulblets rooted freely and made strong plants. The fact last stated is of value in showing that, for mowing to be effective, the work must be done early in the season before the heads have made much growth.

We also ascertained that ninety-five to one hundred per cent. of the undergrouud bulbs grew when the soil contained sufficient moisture, and each bulb produced from five to seven more of its kind.

From the foregoing facts it is seen that the weed in question is capable of reproducing itself with unusual rapidity. Supposing the globes contain one hundred bulblets, which is a low average, the roots five bulbs, and the capsules of one globe eighteen seeds, each plant has the capacity of multiplying to one hundred and twenty-three in one season.

## METHODS OF DISSEMINATION.

The plant may be disseminated in various ways, by seeds and aerial bulblets through the sale of wheat and hay. Purchasers should be very careful to examine these products before bringing them on their farms. The bulbs are frequently conveyed from farm to farm by means of creeks and rivers. Farmers too often resort to the practice of throwing this and other pernicious weeds into streams, which is a quick

method of transferring the plants to farms below them. The prevalence of the Wild Onion along nearly all our streams is largely due to this careless and indifferent practice. It should be vigorously condemned by every good citizen. Burning only should be resorted to with such dreaded weeds.

The pasturing of stock has helped to disseminate the bulblets. A good example has been brought to our notice. A small patch of onions had become established on a Tennessee farm. The owner was advised by a kind neighbor to remove and burn the soil and bulbs of the entire plat without further delay. The farmer, however, thought this was too much trouble, and allowed the plants to remain undisturbed. Soon afterward the cattle were pastured in this field for several months, and as a result, the path leading through the field from the onions to the barn contained many plants the following year. In a few years the entire farm was infested with the weed. The hoofs of the cattle had distributed the bulblets. In this way the Wild Onion is frequently carried from low lands to more elevated localities.

## COMBATING THE WILD ONION.

How can we successfully combat the Wild Onion, is a question of vital interest to our people and one that is being asked every day. The Tennessee Station has made a study of this question, and although we have not gathered sufficient data to give an entirely satisfactory answer, we hope the results of our investigation will be of some value to the farmers of our State who are troubled with this weed or whose farms are liable to become infested.

Of course prevention is better than cure. Carefully examine all feed stuffs that are brought upon the farm and see that no bulbs or seeds are introduced in this way. Do not allow stock of any kind to come on the place from infested farms. If the farm is located on a stream it is important to make a frequent search along its banks for plants.

When only a few plants are found on the farm, carefully lift the bulbs and the surrounding soil, securing all the bulbs, deposit them in an absolutely tight box or vessel, and then burn the contents. If this operation is not thoroughly done it will be of no value. Our attention was recently called to a farmer who had practiced this plan for ten years, at the expiration of which time the plants were as numerous as when he began. The failure was due to the lack of thoroughness. Perhaps only one of the five or six bulbs of each plant was allowed to remain in the soil, or may have been accidentally dropped before deposited in the vessel, or the receptacle in which the bulbs were placed may not have been sufficiently tight. Carelessness in any one particular will result in failure. It is well to remember that each bulb is

capable of multiplying from three to seven fold each year, not including the aerial bulblets.

When larger areas of several square yards or square rods are thickly infested the course to be pursued is different. Of course it would be practically impossible to remove each individual plant and expect to secure all the bulbs. The only method which we can safely recommend at this writing is the trenching and burning of the entire plat. Although an expensive method it is cheapest in the end.

How to destroy the plants on an acre or more of thickly infested land is a question which demands further study. It is a simple matter to keep the enemy quite well confined, but to utterly destroy this weed on such a large area requires a warfare of unusual persistence. Every one will agree that no plant should be allowed to produce heads or seeds. Hence, mowing before the heads begin to form should be practiced annually. To keep the opposing force still further confined, kill the scattering enemies. Circumscribe the main force. Do not allow the scouts to exist. We can not sufficiently emphasize the importance of these two procedures.

We have given special attention to probable methods of eradicating large areas of the Wild Onion. This work was actively begun in June, 1894. Our report can only be upon the progress made. The experiments were conducted both in the field and under glass. Although the moisture conditions in the greenhouse were different from those in the field, the results were practically the same in both cases.

Some of the methods employed in the destruction of other weeds are of no value in combating the Wild Onion. The use of common salt has been suggested, but the amount which would be annually required renders this method entirely impracticable. Many of the bulbs are nearly a foot below the surface, and these may retain their vitality for a year or more. Of course this would require the frequent and excessive application of salt to make it efficient.

PLOWING.—Bulbs were placed in soil eight inches under the surface. When the plants made their first appearance, the entire plat was turned over. In a few weeks the plants could again be seen growing almost as vigorously as before. We have discontinued this experiment, because in the operation of plowing many of the young plants are not plowed entirely under. Unless every plant is turned under the surface, the work will be of little or no value in the end.

FREQUENT CULTIVATION.—A small plat in the field and a pot of bulbs in the greenhouse were thoroughly cultivated every two to five days during the entire growing season of the onion. At the expiration of a year, at least ninety per cent of the bulbs had decayed or lost their

vitality. Many of the sound bulbs remaining had evidently made no growth, and perhaps with such constant stirring these would have decayed in a year or two more. A few plants in the field plat escaped disturbance by the cultivator in several instances, and a careful examination showed that the bulbs had made sufficient growth to regain their original vitality and begin the formation of new bulbs. It was found that when the plants were allowed to make a growth of only two or three inches above the surface, the bulbs would become brighter and evidently gain sufficient vigor to preserve them another year. With any cultivator it is impossible to disturb all the plants at any one working. Hence, we must conclude that this method cannot be a success.

Mowing.—Many bulbs decayed through the frequent practice of mowing. Since the plants cannot well be cut nearer than within two or three inches of the soil, this method has failed for the same reason as that of frequent cultivation.

Cropping.—It will be readily seen that the continuous cultivation of summer crops, as corn or potatoes, can be of no value because the growing season of the Wild Onion begins with the Fall rains, and the active growth continues until May. It has been suggested that annual cropping with rye sown in the fall might prove beneficial. The uncertainty, however, of securing a very close stand renders this method very doubtful. And it is a question whether even such a heavy growth as that of rye would prevent the onion from making some progress.

Shaving the Soil.—One plat was practically shaved at or near the surface of the soil as fast as the green tops made their appearance. We believe this is, because of its thoroughness, the only method which will prove entirely successful, although an expensive one. Not a single plant can remain if the work is properly done. One or two more years of trial will be necessary to determine whether this method will completely eradicate the onion. At the present writing there are perhaps ten per cent. of the original number of sound bulbs in this plat. If shaving proves successful, a large broad-bladed implement may be employed by which the work can be thoroughly and rapidly performed.

Correspondence is invited in regard to any methods which have been tried by our farmers for combating the Wild Onion.

S. B. NEWMAN & CO., PRINTERS AND BINDERS, KNOXVILLE