

The Ohio Naturalist,

PUBLISHED BY

The Biological Club of the Ohio State University.

Volume II,

JANUARY, 1902.

No. 3.

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THE SELF-PRUNING OF WOODY PLANTS.

JOHN H. SCHAFFNER.

In a former article* by Mr. Frederick J. Tyler and the writer, the subject of the self-pruning of woody plants was discussed in a general way, and a number of notes were presented, giving the facts observed up to the time of publication. During the past year the writer has made further observations, which have confirmed the views previously expressed and also added some phenomena not mentioned in the former paper. The work was carried on during the summer in northern Kansas, and continued during the fall in central Ohio.

The past summer was notable for the severe and long-continued drouth, which extended over a large portion of the interior. This cause may have had some effect on the cottonwood, *Populus deltoides* Marsh., which was self-pruning very abundantly before the 15th of July. Many of the branches cut off still retained perfectly green leaves, while on some the leaves were withered or yellow, and others were entirely defoliated before they fell to the ground. The tree shown in the picture (Fig. 1) was standing alone on the prairie. It was photographed on July 17, 1901, and at this time had already cast a large number of branches.

It was discovered that from the middle of July up to the time of complete defoliation numerous branches with fresh, green

*Schaffner, John H., and Tyler, Fred. J. Notes on the Self-Pruning of Trees. *Ohio Nat.*, 1: 29-32, 1901.

leaves were from time to time falling to the ground. Other plants were observed shedding twigs with green leaves, among which may be mentioned *Populus grandidentata* Mx., *Salix nigra* Marsh., *Quercus alba* L. and *Ulmus americana* L. These cases seem to show that the formation of the cleavage plane is often quite rapid, so that the leaves do not have time to wither before the branches are detached.

A considerable number of self-pruning plants were studied which were not included in the former list. The following form basal joints with cleavage planes: *Quercus platanoids* (Lam.) Sudw., *Quercus Alexanderi* Britt., *Quercus primus* L., *Rhamnus*

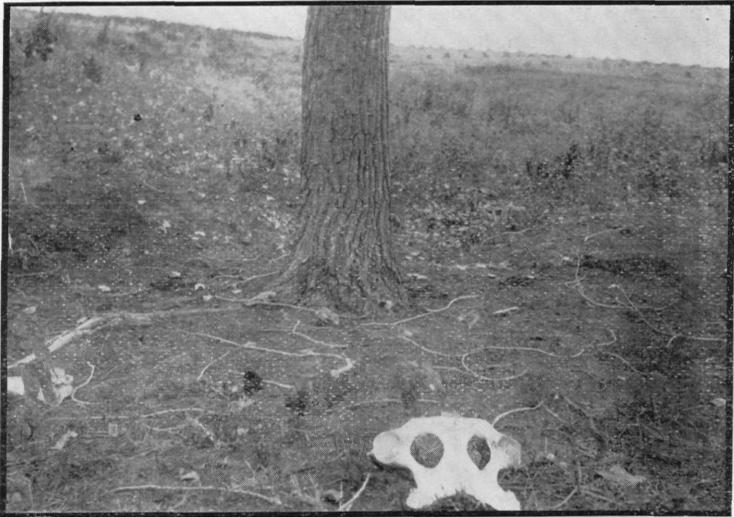


Fig. 1.

lanceolata Ph., and *Ulmus racemosa* Thom. The latter develops cleavage planes in the nodes caused by annual growth, the same as was described for *Ulmus americana* L.

Two trees may be quite closely related and still act entirely different when it comes to the matter of self-pruning. For example, *Ulmus americana* L. has developed the self-pruning habit to a remarkable degree, while the process seems to be entirely absent in *Ulmus fulva* Mx. The same is true in the oaks. *Quercus alba* L. and *Quercus acuminata* (Mx.) Sarg. self-prune abundantly, while in our common red oaks no such process was discovered, although diligent search was made. The following oaks failed to show any evidence of self-pruning: *Quercus rubra* L., *Q. palustris* Du Roi., *Q. coccinea* Wang.,

and *Q. velutina* Lam. It may be that the whole red oak group is devoid of this habit.

In some of our willows very numerous branches are developed at the beginning of each growing season. It was found that in many cases a large part of these branches drop to the ground long before the growing season is ended. A true basal joint is formed and the twigs are cut off by the development of a cleavage plane. This is therefore a process distinct from the development of brittle zones in the ripe branches, which may be one or more years of age. This process of shedding twigs of the season is well developed in *Salix interior* Rowlee, our common long-leaved willow. On July 11th numerous branches of the season were being cut off in this plant, some with leaves and some with the leaves shed. The writer saw any number of such branches on the ground under a patch of long-leaved willows, and also many which would fall at the slightest touch. In *Salix fragilis* L. this process is also prominent, and small, green branches were shed abundantly before August 13th. The same thing was observed in *Salix amygdaloides* Adrs., although it seemed to be much less developed than in the two previously mentioned species.

In some plants the branches of the season which bear the inflorescence fall off after the fruit has matured, and in this way the individual is kept in a properly pruned condition. This is the case in *Prunus cerasus* L., the common sour cherry, where the short branches which bear the umbell-like clusters of flowers drop off later in the season. The same appears more prominently in *Prunus virginiana* L., in which the flowers are in racemes, terminating short, leafy branches of the season. These drop off after the fruit is ripe, and thus the shrub is kept well pruned, since these short, flower-bearing branches are produced very abundantly.

Mr. Tyler called my attention to the hackberry, *Celtis occidentalis* Mx., in which the slender annual fruiting branches also drop to the ground during the fall and winter. These branches dry off at the outer ends while the fruit ripens, and are then very abundantly detached at the base, where a brittle layer appears to be developed. It is interesting to note that the base containing the brittle layer remains green for a short distance up the branch. The writer has gathered large quantities of such branches under fruiting hackberry trees. Many of the branches fall with berries still attached, although usually the berries have all been shed before the branches break off. Occasionally some of the ordinary green branches are detached, the base becoming quite brittle. So far as observed, however, no special process of self-pruning appears to be present except that of the fruiting branches.

Several varieties of the cultivated grape, *Vitis labrusca* L., were observed to prune themselves to a limited extent by the formation of transverse joints, corresponding to the leaf nodes, in the same way as was described for *Ampelopsis cordata* Mx. This is also true for the common riverside grape, *Vitis vulpina* L., which prunes itself quite extensively. It is probable that all of our wild grapes possess the process of self-pruning, although no further observations have been made on this point by the writer.

In this place it may be well to call attention again to the formation of joints and cleavage planes in certain geophilous, herbaceous plants. These are especially remarkable in *Psoralea floribunda* Nutt. and *Psoralea argophylla* Pursh., and similar joints are no doubt formed in many other such plants.

As is well known, the American mistletoe, *Phoradendron flavescens* (Ph.) Nutt., produces numerous joints, which from herbarium specimens appear to develop cleavage planes and thus prune off branches. The same appears to be true also to a more striking extent in the European *Viscum album* L. The writer has had no opportunity to study these plants in the field, but it is probable that the whole family of Loranthaceae would afford an interesting study along this line.

It is curious that, in so recent a work as Bailey's *Cyclopedia of American Horticulture*, no mention is made of the remarkable process of self-pruning in the article on artificial pruning. The subject is practically dismissed by the statements that "nature prunes," and that "dying and dead branches in any neglected tree-top are illustrations of this fact." But no reference is made to the formation of cleavage joints and the cutting off of green branches, nor the perfect manner in which the scars heal over in many trees. The writer believes that horticulturists should study these processes with great care, since these natural phenomena will probably indicate fundamental principles which will be well worth considering when an attempt is made to approach the subject of artificial pruning in an intelligent manner.

OHIO TUMBLE WEEDS—The following plants should be added to the list of Ohio tumble weeds, as given in the OHIO NATURALIST I: 129:

Baptisia australis (L.) R. Br., perennial, frequently acts as a tumble weed, although it does not seem to develop a special cleavage joint in the stem.

Solanum rostratum Dunal., annual, makes a good tumble weed.

Sisymbrium altissimum L., Tumbling Mustard, has been reported from eastern Ohio by L. D. Stair.—J. H. S.