36. Witches'-Broom of Hackberry

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Hackberry is commonly planted in cities and parks in much of the central Great Plains. Although principally a bottomland tree, it is able to withstand a wide range of moisture and temperature conditions and does well in an urban environment. A common and sometimes disfiguring branch disease of hackberry is witches'-broom.

Hosts and Distribution

Witches'-broom probably occurs throughout the range of hackberry in the Great Plains; it is very common in eastern Kansas and Nebraska. Its principal host is hackberry.

Winter surveys of northeastern Kansas city street plantings, showed between 40 and 75 percent of the hackberry trees had witches'-brooms. However, even though branches of mature, closely spaced hackberry trees penetrated and touched the canopies of each neighbor, many trees had remained broom-free for many years in spite of the fact that neighbors were heavily broomed.

Symptoms and Signs

The most apparent symptom of witches'-broom is a dense clustering or "brooming" of twigs. Because brooms do not occur on branches less than 1 year old, they are not found at branch tips. They occasionally appear to be terminal, however, when a branch leader fails to develop fully or when it dies and breaks off. Buds of shoots within a broom are usually larger than normal and have more open bud scales.

The first indication of witches'-broom appears in the

Figure 36-1. Young broom on hackberry with numerous enlarged buds.

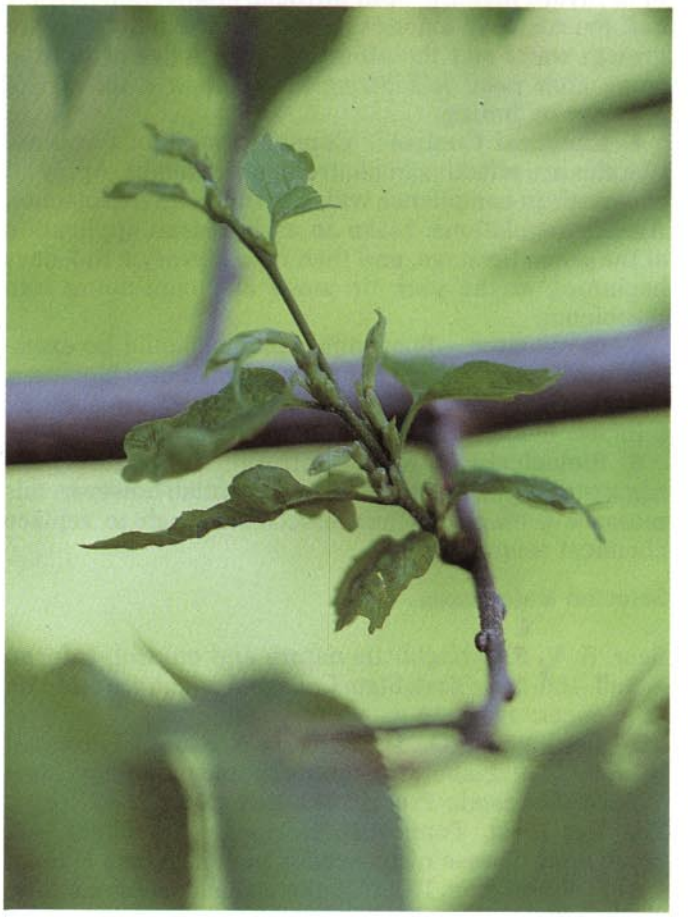

Figure 36-2. Young broom with open cluster of affected twigs.

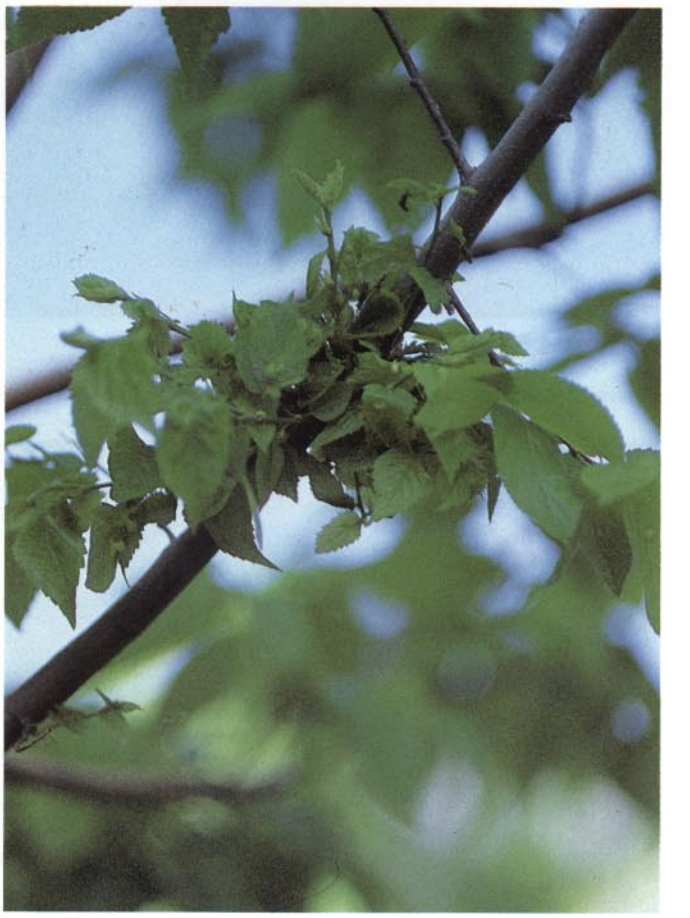

Figure 36-3. Old brooms with compact woody centers.

buds on branch portions at least 1 year old. The infected buds are usually smaller than normal, and often there are many small, swollen buds instead of a single large one. The shoots produced from the diseased buds grow vigorously and produce buds that are usually larger, more open, and more numerous than normal (fig. 36–1).

During the following year the development of the broom varies, depending upon the vigor of the diseased branch. If the branch is vigorous and grows rapidly, its buds develop into branchlets similar to the original, and over a number of years a loose or open cluster of diseased twigs is formed (fig. 36–2). If the diseased branch is weak, only the buds at the base grow, resulting in a large number of abortive twigs. Over several years this type of development produces a compact broom with a firm woody center often an inch or more in diameter (fig. 36–3).

Disease Cycle

The cause of witches'-broom of hackberry is not understood. An eriophyid mite (*Aceria* sp.) rarely found on symptomless trees is almost always associated with the brooming; the powdery mildew fungus *Sphaerotheca phytophila* is much less often found. The original report of the mite/mildew association with brooms has commonly been misinterpreted as a requirement for the abnormal development of witches'-brooms. However, there is no experimental evidence to confirm or disprove the role of these organisms in the development of the disease.

Viruses and mycoplasma-like organisms (MLO's) also can cause brooming in woody plants. Whether the growth abnormality results directly from mite activity, whether the powdery mildew is involved but remains too obscure to be routinely identified, or whether a virus-like entity is instead responsible remains uncertain.

Damage

Witches'-brooms on hackberry are more unsightly than harmful to the tree. Brooms can cause branches to break more readily and therefore expose wood to decay fungi. Extensive brooming can reduce the vigor of the tree. However, trees are seldom seriously injured.

Control

No effective control measures are known for this disease. Pruning back diseased twigs to sound wood can improve the tree's appearance.

Selected References

Kellerman, W. A.; Swingle, W. T. Branch knot of the hackberry. Annual Report of the Kansas Experiment Station, 1888. Manhattan: Kansas State Agricultural College; 1889: 302–315.

Snetsinger, Robert; Himelick, E. B. Observations on witches'-broom of hackberry. Plant Disease Reporter. 41: 541–544; 1957.