Purple Loosestrife – Cultivar Fertility

Purple loosestrife is a perennial herb, an emergent aquatic noxious weed, and a species that is prohibited for sale in the state of Washington. As a noxious weed, control is required in designated areas of the state, or in areas as deemed appropriate by county weed control boards. Control is defined as preventing all seed production. *Lythrum salicaria, L. virgatum*, and all cultivars are prohibited for sale by the Washington State Department of Agriculture.

Why is it illegal to buy or sell any cultivars? In 1987 the Minnesota Department of Agriculture (MDA) declared purple loosestrife (*Lythrum salicaria*) a noxious weed, due to the alarming spread in its wetlands. All sales of this species were also prohibited. At this time, The MDA did not prohibit the sale of *L. virgatum*, or the cultivars – partly out of sympathy for the nursery industry. The cultivars of *L. virgatum* were considered sterile AND it was thought the cultivars could be morphologically identified from purple loosestrife.

By 1988 both species were listed as noxious weeds (in Minnesota), and any and all cultivars were prohibited for sale. In 1989 research was underway to determine whether or not the cultivars of *L. salicaria* or *L. virgatum* were indeed sterile.

<u>*Lythrum* Reproductive Morphology:</u>
The female reproductive parts consist of the stigma, style and ovary. *L. salicaria* is tristylous, meaning there are three style lengths – short, medium and long. Each flower on each plant will only have one style length – if one flower has short styles, all flowers on that plant has short styles.

The male reproductive parts consist of the filaments and anthers. Each *Lythrum* flower has two sets of anthers, and the length of each set differ. So, the anthers can be short and medium, short and long, or medium and long.

The combination of styles and the anthers on each flower will be short, medium and long. For example, if the styles are short, anthers are medium and long.

Trystyly is a complicated preventative measure to keep the flowers from self fertilizing. In "legitimate" pollinations, short styles will be pollinated by short anthers, medium styles by medium anthers and long styles by long anthers. "Illegitimate" pollinations are possible, but seed production is lower.

<u>The Confusion:</u> 'Morden Pink' was a cultivar released in 1937, and it "originated from a male-sterile mutant of *L. virgatum*". This does not mean that Ii is male sterile, nor does it make it a sterile hybrid. When 'Morden Pink' was crossed with the native *L. alatum*, the new varieties were heavy seed producers. But, it is often advertised as a sterile hybrid.

<u>The Research:</u> Combinations of cultivars and wild populations of *Lythrum* were cross pollinated to determine the fertility of male and female cultivars, to check germination rates, and to check the fertility of the offspring. To check for viable pollen, pollen grains were stained, then looked

at under a microscope. Female fertility was determined by seed production. Seeds were sown for germination studies.

Results: Viable pollen rates were sometimes as high as 100%. Every case except one produced an average viable pollen rate of 50%. "There is no evidence to suggest appreciable male sterility for the tested cultivars. This disproves the assumption that 'Morden Pink' is a male-sterile mutant (Cutright, 1986 as cited in Anderson and Ascher, 1992).

No cultivar was found to be female sterile (Anderson and Ascher, 1992).

Germination rates were between 30-100%, with the majority of germination rates between crosses over 50% (Anderson and Ascher, 1992).

During this research there was a lack of clonal integrity of the horticultural cultivars. These clones did not look the same.

The Implications: The research showed that all loosestrife cultivars produced viable pollen, were female fertile, and they produced high germination rates of viable seeds. These cultivars are to be considered as a source of viable pollen with the potential to produce seed, when crossed with wild populations of loosestrife. A cultivar population that does not produce seed could be explained by clones with the same style morph grown and sold from one location. Once the geographical isolation is removed (a garden clone meets a wildland loosestrife), a legitimate cross is possible.

References:

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