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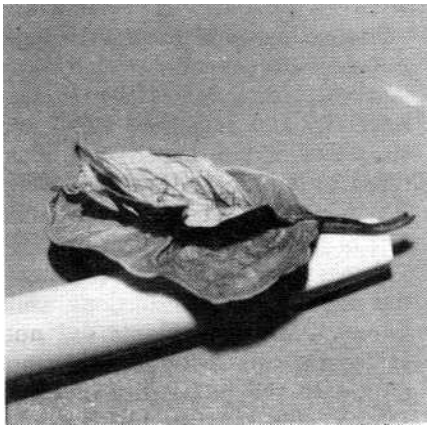
POINSETTIAS -Leaf Malformation

Leaf malformation and development of lateral branches on unpinched poinsettia plants, Gutbier V-14 Glory, were observed in October 1987 in Oregon (Photographs 1- 5).

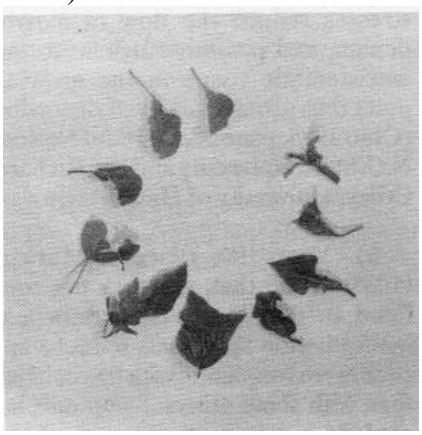
Photograph 1. Malformed leaves are formed on poinsettia plant, Gutbier V-14 Glory, on lateral branches developed after pinching.



Photograph 2: An example of a severely malformed leaf developed after pinching.

Many factors can cause leaf malformation...

1) **Cycocel Application**: Plants that were wilted and water-stressed when sprayed with Cycocel developed puckered, malformed leaves. (Seeley, 1986; Ohio, 1988).



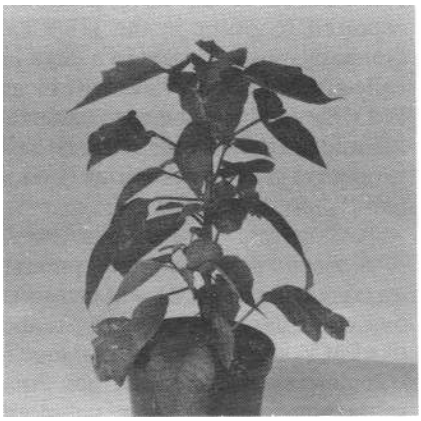
Photograph 3. Pattern of leaf malformation on a lateral branch developed after pinching. *(clockwise from the top of the photo or apical tip of the branch*) The sixth leaf from the branch tip is the most severely malformed.

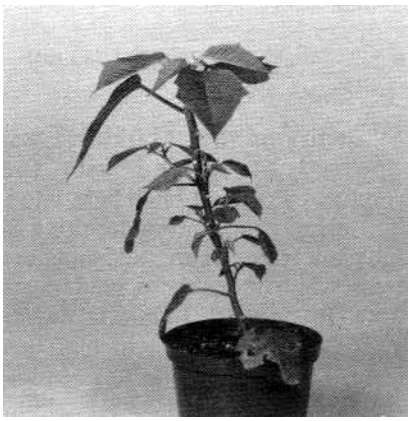
2) **Molybdenum Deficiency**: Severe leaf malformation or crippling may be due to molybdenum deficiency (Seeley, 1986).

3) **Calcium Imbalance**: "Calcium uptake and translocation are under investigation. There do not appear to be any significant differences in calcium uptake among poinsettia cultivars. The uptake of calcium does not seem to be different in plants with distorted leaves and those with normal leaves. Foliar applications of calcium solutions seem to

be more effective in relieving leaf distortion than applications of calcium fertilizers to the root zone. Attention is now turned to the movement of calcium within the plant" (Ohio 1988, page 58, Dr. John Peterson).

4) **Temperature Extremes**: Excessively high (75F at night and 86F in daytime or excessively low 57F nights and 64F days caused puckered, chlorotic foliage in North Carolina." (Larson, 1970; Ohio, 1988).





Photographs 4 and 5. Lateral branches developed on unpinched plants of Gutbier V-14. Plant in the right photo has had leaves removed from the primary plant stem to reveal development of lateral branches.

5) Moisture Stress: Other researchers are testing the hypothesis that moisture stress is the cause of abnormal leaf distortion. Water-related stresses reduce the flow of molybdenum, and possibly calcium, to the meristematic tissue in the growing point thus giving rise to leaf distortion (Ohio 1988, page 58, Dr. Paul Nelson, N.C. State University and Dr. Richard Criley, University of Hawaii).

6) Virus-like Disease: Matkin (1985) stated that, although not confined to Gutbier V-14, certain leaf malformation symptoms seem to appear more frequently with this cultivar than with some others. Symptoms included:

- Premature breaking of side buds without the terminal having been pinched.
- Distortion of foliage with new leaves malformed, thickened and sometimes chlorotic. **SYMPTOMS ARE ALMOST VIRUS-LIKE.** Internodes beneath these new leaves may be very short and constricted. Distortion usually occurs on growth following sudden temporary stop of terminal growth immediately after rooting of cuttings has occurred.
- Bracts of side shoots may also be malformed. Symptoms suggest virus, however subsequent foliage development may be normal.
- Overall, slower growth than normal.

Conditions that Matkin (1985) reported associated with the symptoms included: High light intensity during propagation resulting in high plant temperatures and **moisture stress** when there were inadequate roots. Inadequate humidity during propagation resulting in moisture stress. Root injury due to chemical phytotoxicity or root pruning resulting in *moisture stress*. Overwatering resulting in **moisture stress**.

7) Viruses: Viruses sometimes cause leaf mottling and deformation of poinsettia. "Little is known of the poinsettia virus diseases. They may be more serious than presently recognized" (Ohio 1988).

Poinsettia mosaic virus (PMV) with symptoms of prominent veinclearing (which later became mosaic patterns) and distorted leaves and bracts (some bracts failed to color normally and remained small and strap-like or fan-shaped) was identified by Fulton and Fulton (1980). PMV-infected poinsettias became free of symptoms when grown at 75F. Cuttings from PMV-infected poinsettias developed leaf distortions, while known PMV-free plants did not. However, this evidence does not eliminate the possibility of other agents being associated with the infected cuttings (Fulton and Fulton, 1980).

Symptoms of poinsettia mosaic virus (PMV) may be unapparent or consist of mild mottling of the foliage; some cultivars are completely infected, probably the result of vegetative propagation from symptomless plants (Pfannenstiel, etal. 1982). In a survey of commercially grown poinsettias conducted in British Columbia in December, 1981, poinsettia mosaic virus (PMV) was detected in 8 of 9 cultivars sampled and in 94% of the 65 samples tested; this suggests that the virus is prevalent in commercial poinsettia stocks throughout North America (Chiko and Godkin, 1984). Brunt, etal. (1981) reported that poinsettia mosaic virus (PMV), previously reported to occur in the USA and Germany, was prevalent in a large locally-grown stock of cv. Annette Hegg. PMV has not been shown to cause the leaf and bract malformations that have prompted growers' inquiries (Fulton and Fulton, 1980).

A second poinsettia virus, poinsettia cryptic virus (PCV), was identified by Koenig and Lesemann (1980) and, like PMV, was found to be common in commercially grown poinsettias. Poinsettia plants with mosaic symptoms and leaf malformations yielded both PMV and PCV.

Gulati, etal. (1979) reported that development of axillary buds into branches took place in all virus-infected poinsettia stem cuttings, but bud sprouting did not occur at all on more than half of the noninfected stem cuttings. And, axillary buds on healthy cuttings that did sprout produced very little growth compared to those produced on virus-infected cuttings. Gulati, etal. (1979) did not specify which virus was infecting the cuttings.

We do not know the cause of the leaf malformations and development of lateral branches observed on Gutbier V-14 Glory in Oregon in October 1987.

References:

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