"STITCHED END", "GIANT HILL" AND FASCIATED STEM OF POTATOES IN ALASKA

C. H. Dearborn

'Stitched End', an unusual growth condition of a potato tuber, was observed in Alaska in 1960 for the first time. Reid (5) reported an observation of "stitched end" of potato in 1961 in Alberta, Canada. Three Netted Gem tubers showed the defect. Stem fasciation was also shown to be associated with "stitched end" tubers. Blodgett and Rich (2) reported that "stitched end" in Russet Burbank variety collected in the Upper Snake and Yakima Valleys was tuber-perpetuated and gave rise to fasciated-stemmed plants. Its cause or importance was not known. Neither Hardenburg (3) nor Barrus and Chupp (1) mentioned the abnormality in their discussion of tuber defects.

Fasciation in tomato was reported by Zielenski (7) and a pertinent bibliography on fasciation in horticultural plants presented. White (6) reviewed fasciation and presented evidence of its occurrence in many plant families around the globe, although fasciation was not known in plants of halophytic and hydrophytic environments. More recently Marx and Hagedorn (4) have reported on fasciation in Pisum and postulated that it is conditioned by a mono factorial recessive gene.

Variations in plant material found by workers in this subject leave some doubt as to the real cause of fasciation. Stem fasciation has been observed in white ash saplings in southern New Hampshire, in watermelon on Luzon, Philippine Islands, and on strawberry, cabbage, dandelions, Alsike clover, Norway poplar and cottonwood in Alaska.

"Stitched end" of potato (Fig. 1) after tuber was conditioned for sprouting shows that buds other than those of the apical whorl are fasciated. The affected tuber is from a clone of Green Mountain that has been an Alaskan standard in annual variety trials since 1950. Stock of this clone, although not of this tuber, was grown in 1961 and 1962 with no further evidence of "stitched end".

In late June of 1962, stem fasciation was observed in the early growth of tops of Ontario potatoes. This stock had been cut and planted by the tuber unit method. No "stitched end" was observed in the mother tubers at cutting nor had there been any evidence of abnormal growth characteristics in tubers or tops of the previous eight annual crops. Culture of the crop had been the same each year through 1959. In 1960 and 1961, size "B" whole tubers were used for seed which was a departure from the usual tuber unit method. Fertilizer for the 1962 crop differed from previous mixtures in that Sul-Po-Mag was used to supply 44 pounds of MgO per acre and the ratio was changed from 8-32-16 to 7-22-14, N,P₂O₅ and K₂O respectively. These factors seem insignificant since four other potato varieties were cultured in the same manner, but did not develop fasciated stems. "Giant hill was suspected in one of these four varieties.

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2Horticulturist, Alaska Agricultural Experiment Station, Palmer, Alaska.
Approximately one per cent of the tuber units of Ontario showed evidence of fasciated stem in early July, 1962. Seldom more than one hill showed stem fasciation within a tuber unit. Even in these hills at least one apparently normal stem rose above the fasciated growth and tended to obscure it. Affected tuber units were rogued in early July. "Stitched end" was not observed on new tubers that had formed.

As the crop approached the end of the growing season, vine growth of a few tuber units scattered throughout the planting were about one-third larger than others. This top growth resembled that associated with "giant hill", as described by Barrus and Chupp. "Giant hill" has been observed each year in widely scattered commercial plantings of Green Mountain and occasionally in certified plantings where roguing is diligently practiced. "Giant hill" had been observed previously in the Ontario variety.

Just prior to harvest of the field of Ontario that had shown fasciated stems in July, eight tuber units were hand dug. Four were normal vine types and four were "giant hill" tuber units. The results of tuber count per tuber unit and weight are presented in Table 1. The limited data show more tubers and weight per tuber unit from normal than from very large vine types. Average weight per tuber was greatest from large vines. Some tubers from the large vine type were constricted near the stolon region. Others showed a thickening of the stolon at the point of attachment to the tuber. These stolons adhered to the tubers at harvest. Roughness was characterized by shoulders toward the apical end of tubers.