Experimental Presswheels

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The Beet Sugar Development Foundation has experimented with hundreds of types of presswheels since the day of the Foundation's inception in 1945. The majority of this work has been conducted *in* cooperation with Colorado A & M College. Theories regarding presswheels have been thoroughly investigated and various designs, both commercial and experimental, have been tested side by side under identical conditions. Objective in this work was the location of a simple type of presswheel adaptable to commercial drills which would improve field germination *in* the majority of field conditions. A description of the many types used is far too long to include in this summary.

It has been theorized that improved field germination is obtainable through a compaction of the soil immediately around and below the seed zone to improve capillary action of the subsoil moisture. This, in part, is accomplished by the commercial concave presswheels by a side pressure immediately around the seed zone and the creation of a loose soil condition immediately above the seed.

This compression also can be accomplished by pressure from immediately above the seed but at the expense of a depressed profile which creates a pocket in which moisture can lodge and, subsequently, create a crust condition. This was the observation with a standard convex tire similar to those found *on* children's wagons, etc.

Early experience with the furrow-former wheel exposed a theory which was recently developed into a presswheel combination which shows considerable promise. Early trials with such type presswheels were conducted with semi-commercial presswheels of a v-shaped profile which were not of a size immediately adaptable to our beet and bean drills. Excellent results, however, were obtained which encouraged thinking toward a simple type of v-shaped presswheel.

In 1950, the idea was conceived that a standard concave presswheel would make an ideal rim into which a rubber tire filler of any shape or profile could be inserted. In cooperation with the Gates Rubber Company, the Beet Sugar Development Foundation had three different profile designs of both semi-pneumatic and solid type moulded at the Gates Rubber Company in Denver, Colorado.

These prototype rubber filler tires were received at a date too late to obtain satisfactory "spring condition" results but the tests conducted were satisfactory to the point of warranting further studies.

In 1951, approximately 500 of these semi-pneumatic filler tires (of three profile shapes, elliptical, Semi-V and V) were fabricated for extensive test work in a fair cross-section of our beet-growing territories. These were sent out accompanied by a survey form on which comparative data with the standard presswheel was to be recorded.

From more than 100 surveys conducted in Washington, Idaho, Utah, Montana, Wyoming, Nebraska, Colorado, Minnesota, California and Kansas, the overall increase in emergence with this type of presswheel was 14.2 percent, or 114.2 percent of standard. The above data was compiled from more than 1,000 100-inch counts in the field and a comparable number

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Figure 1.—Convex rubber tire filler mounted on standard presswheel. Note how drag-chain mulches indentation created by pressing action.

of counts on the adjacent standard presswheel. The total average increase in emergence boils down to an increase of six plants per each 100 inches of row. This figure is highly significant.

There are cases where emergence was depressed by this type of experimental wheel. Such surveys have been taken into consideration on an equal weight basis with those which showed increased emergence.

It is concluded that, in the territories where there is marginal rainfall, the convex type of presswheel is advantageous in procuring an improved stand. In territories of adequate rainfall and where planting is necessary in wet conditions, a rubber presswheel will not show an advantage. In such conditions, the operator would become perplexed with mud clinging to the rubber presswheel. It is theorized that in such conditions of high moisture, it is only necessary to compact the soil around the seed sufficiently to have the soil physically contact the seed in the soil and presswheels are of less consequence than in the territories of marginal rainfall.