

SUMMARY OF BREEDING PROBLEMS

The Amalgamated Sugar Company

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The most important problem with which The Amalgamated Sugar Company is concerned is that of sugar content. It is hoped that some improvement can be made in sugar content while at the same time maintaining curly top resistance and high yields. Previous work in this problem by means of mass selections has not been entirely satisfactory. A new approach will be made through the production of hybrids or top crosses in which inbred lines and/or selections of high sugar content will be utilized as parents.

Other problems which are considered important breeding objectives are more or less common to the sugar beet industry as a whole. Some of these problems are:

1. Development of locally adapted monogerm varieties.
2. Resistance to root rots and storage rots.
3. Cold resistance.
4. Development of varieties low in molasogenic substances, i.e., Na, raffinose and noxious N₂, etc.

The possibility of solving all these problems is indeed remote. In fact, progress towards the solution of any one of these problems will require tremendous efforts. Nevertheless, breeding procedures based on the development of O-type inbred lines which have been selected for one or more of the above characters, and hybrids between them, appears to offer the best approach to the ultimate solution of these problems. It is recognized that the task of producing and testing inbred lines for specific characters as well as for combining ability is a vast undertaking. Therefore, close cooperation between sugar beet breeders and research organizations would greatly facilitate the progress of these projects.

Summary of Problems

1. Combine as rapidly as possible high sucrose percentage, high curly top resistance, and high yields.
2. Improve resistance to root rots, lower respiratory rates, and improve storageability.
3. Improve purity through the development of varieties low in Na, K, and noxious N content.

Summary of Suggested Procedures

1. Use the true self fertility gene in making inbred lines.
2. Index breeding material for O-type male sterility.

3. Determine as rapidly as possible how male sterile hybrids can best be handled - e.g. How much pollinator is necessary, etc.
4. Top crosses should possibly be the immediate step. These would be followed by M. S. hybrids between inbred lines.
5. A close cooperative program between commercial companies and the Division of Sugar Plant Investigations will bring about the above outlined program in the shortest time. The Amalgamated Sugar Company hopes to work out a very close cooperative program. We are willing to work on any basis which will facilitate the overall program.