Canola Hybrids

The Second Generation is not the Same as the First

THE CANADIAN SEED TRADE ASSOCIATION (CSTA) knows farm profitability is a critical issue that must be addressed. As agricultural producers themselves, our member companies are well aware of the risks associated with the vagaries of weather, international markets, and other factors affecting production and grain prices. Seed businesses wrestle with the same risk management concerns as their customers. CSTA member companies also recognize the relationship between the value of an agricultural input and its associated cost. With this value in mind, CSTA recommends strongly against the replanting of F_2 grain. Such replantings, if they occur, expose farmers, grain handlers, and exporters to considerable risk.

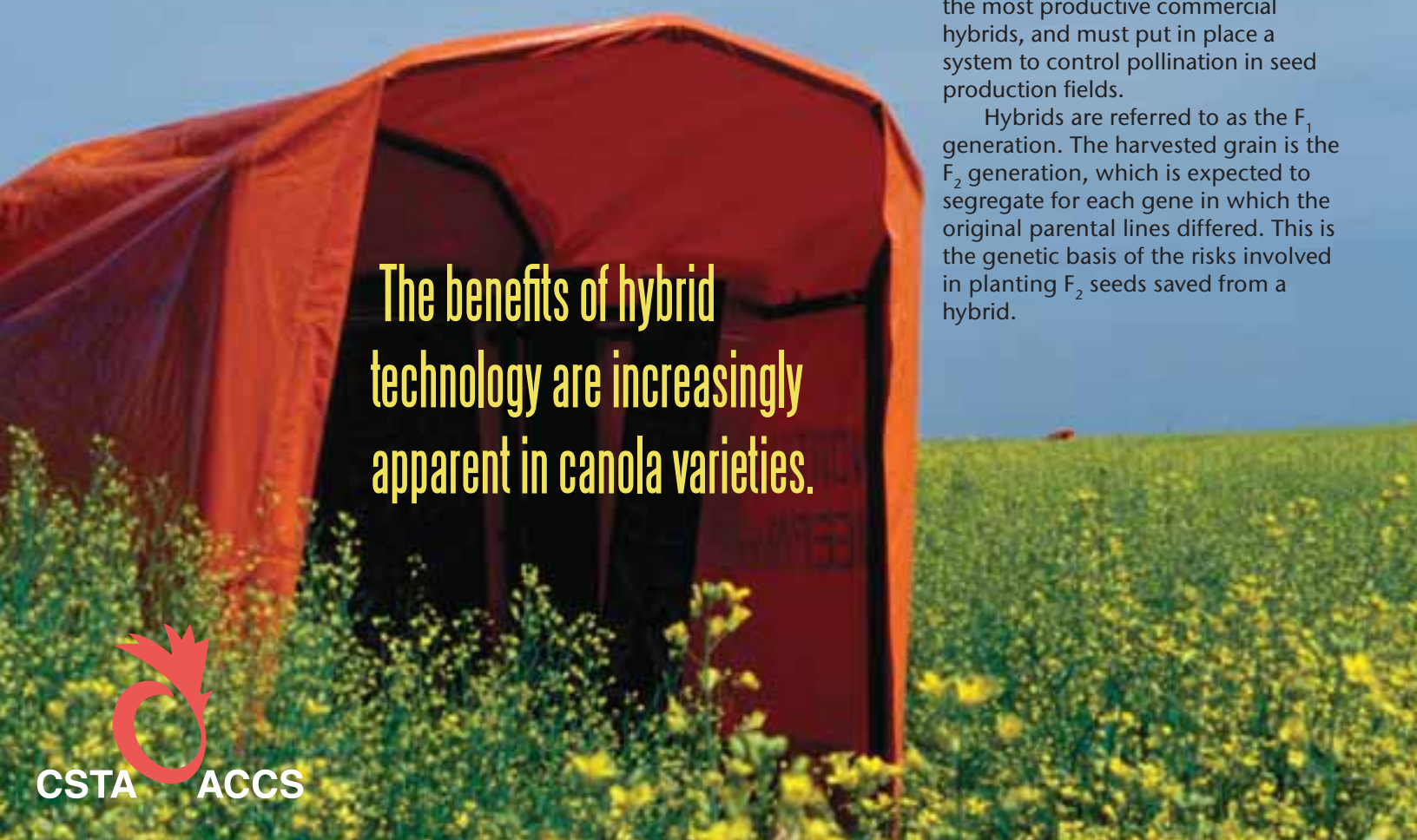
Agricultural producers tend to be rapid adopters of new technology to enhance their profitability, evident by the switch from open-pollinated varieties to hybrids in corn and many vegetables. The benefits of hybrid technology are increasingly apparent in canola varieties as well, as hybrid canola varieties accounted for 27% of the seed market in 2002, 35% in 2003, 40% in 2004, and approximately 50% in 2005.

What is a Hybrid?

Plant breeders have long recognized the increased productivity associated with hybrids: dramatic increases in yield, uniformity, and harvestability have meant hybrids are almost totally adopted in crops where they are available. These increases are based on heterosis or "hybrid vigor", which results from the specific combination of two dissimilar parents each contributing their unique genes to the hybrid progeny. While allowing an increased combination of traits, this means that a hybrid will not faithfully reproduce itself – it will produce a range of progeny which may differ in productivity (yield), maturity, disease resistance, quality traits, and many other characteristics.

Hybrid breeding and production is much more labour intensive and costly than the breeding and production of self-pollinating crops or of open-pollinated varieties. First, true breeding inbred parent lines must be developed. Breeders must then determine the specific combinations of parental lines which will produce the most productive commercial hybrids, and must put in place a system to control pollination in seed production fields.

Hybrids are referred to as the F_1 generation. The harvested grain is the F_2 generation, which is expected to segregate for each gene in which the original parental lines differed. This is the genetic basis of the risks involved in planting F_2 seeds saved from a hybrid.



Consequences

Due to segregation, a certain percentage of the F_2 plants could be:

- susceptible to various diseases and/or herbicide damage;
- sterile;
- immature at harvest, leading to green seed problems in canola;
- over-mature, leading to harvest losses through shattering and the associated volunteer problems in subsequent seasons.

Additionally, the grain harvested from the F_2 generation might not meet the definition of canola. Since the F_2 generation is not the hybrid, it is not registered. It is important to note that the Seeds Act prohibits the sale of seed of unregistered varieties due to unknown quality factors which may damage Canada's trade in grains and oilseeds.

Risk Management

Any possible use of F_2 grain as seed is in the hopes of cost-reduction, so it is important to be aware of the opportunity costs involved. First, the grain is diverted from commercial channels. Second, increased seeding rates, storage costs (and losses), management, cleaning and testing, and time pressures all add up to increased costs. When these factors are considered, the price difference between certified and bin run seed is not as great as might be imagined with all crops, and the increased risk makes the business case unattractive.

Farmers should be aware of the opportunity costs associated with using less than the best and latest genetics.

Another consideration is that, as an unregistered variety, it is a contravention of the Seeds Act to sell seed of the F_2 generation by variety name. Selling or replanting of this grain as seed may also violate the contract obligations, patent rights, or bag license which are conditions of the initial sale of the hybrid seed. Additionally, farmers should be aware of the opportunity costs associated with using less than the best and latest hybrids or varieties. Risk management strategies based on the highest quality inputs are generally the most effective.

Seed Quality

Seed quality is affected by a number of factors. Seed companies take many precautions to protect the quality of the seed which they produce, including harvesting at a slower speed, and taking extra care to set up the combine and avoid mechanical damage from augering or drops. Fields are also monitored to ensure weeds, volunteers, and off-types are removed. Seed lots damaged by disease or environmental factors such as frost are discarded.

Seed companies will stand behind their products, but there are no backups for non-certified seed. Many dual-purpose seed treatments are unavailable for on-farm use due to the specialized nature of the precision application equipment required, compounding the problems associated with the use of F_2 seed, and further increasing the risks involved with the use of this seed source.

Bottom Line

The agricultural industry recognizes the diminishing returns available to commodity growers and is developing more and more identity-preserved options for producers. The premiums associated with these opportunities are dependent on unique quality parameters which are jeopardized by changes due to segregations of second generation material.

The harvested material of an F_1 hybrid crop has not been tested or registered for use as seed, and its performance for this purpose is unknown. The CSTA does not recommend using such grain as planting material for subsequent crops due to the increased risks to both the producer and the industry.