

IMPROVED CROP MANAGEMENT

The key to successful sugarcane farming

The American agronomist, Robert Wagner, some decades ago made the telling statement, "The gap between current average yields and maximum economic yields is the world's greatest undeveloped food reserve". This astute observation holds true for all crops, including sugarcane, and for our industry could be adapted to read, "The greatest opportunity for improving cane supply lies in closing the gap between what most growers are currently achieving and their maximum potential yield".

WHAT IS THE SECRET TO CLOSING THIS YIELD GAP? THE ANSWER, CONTRARY TO POPULAR BELIEF, LIES NOT IN THE DIRECTION OF SOME ELUSIVE SCIENTIFIC BREAKTHROUGH OR PLANT BREEDING ACHIEVEMENT. RATHER, IT IS FOUND IN A PRINCIPLE THAT TENDS TO BE OVERLOOKED BY VIRTUE OF ITS VERY SIMPLICITY: IMPROVED CROP MANAGEMENT. WE CANNOT ESCAPE THE FACT THAT THE DIFFERENCE BETWEEN WHAT TOP GROWERS AND AVERAGE GROWERS

ARE OBTAINING IS LARGELY A MATTER OF MANAGEMENT; BOTH HAVE ACCESS TO THE SAME VARIETIES, AND NATURAL RESOURCES (RAINFALL AND SOILS) ARE OFTEN SIMILAR FOR THE TWO GROUPS. WISE AND SUCCESSFUL FARMERS HAVE LEARNED THIS LESSON; RECALL THE STIRRING ADDRESS OF MIDLANDS GROWER ANT EDMONDS AT KWA-SHUKELA, MOUNT EDGECOMBE IN 2008, WHEN HE DREW ATTENTION TO THE PRINCIPLE OF "COST-EFFECTIVE YIELD MAXIMISATION" AND EXHORTED THE MANY GROWERS PRESENT TO "BE ON TOP OF YOUR

GAME!" ANT WENT ON TO HIGHLIGHT A RANGE OF BASIC MANAGEMENT PRACTICES THAT NEED TO BE IN PLACE IN ORDER TO ACHIEVE IMPROVED YIELDS.

The basis for the enormous rewards resulting from improved management practices lies in the positive inter-relationships between crop growth factors. Scientists have termed these inter-relationships "The Law of the Maximum", which simply states that "the magnitude of the response will



Left and above: Well spread tops in Eston.

increase as more and limiting factors are corrected". By way of illustration, suppose a crop is N deficient, while at the same time weed control is inadequate and root development is restricted by nematodes. Quite obviously, the yield response to N (and thereby returns on this input!) will be vastly improved if the nematode and weed problems are also corrected. In a nutshell, therefore, the Law of the Maximum involves applying several best management practices (BMPs) *simultaneously*.

While it is not practical to provide a comprehensive list of management practices in an article of this nature, the items that follow will provide a sense of the basic management practices that, given the requisite attention, will deliver superior yields.

Land use planning

In addition to financial and business operation plans, every farming enterprise should have a sound plan for the most important resource: the land. Different parts of the farm require different types of management and these must be integrated into a balanced working plan. A comprehensive land use plan will integrate the agronomic and mechanisation practices of the sugarcane farm with the climate, soils, water and topography to obtain optimum and sustained economic crop production.

Variety choice

Successful sugarcane farming starts with choosing a variety that

is suited to the soil and the prevailing agroclimatic conditions, and by ensuring that harvesting is done at the appropriate age and time of year for that particular variety. In other words, choose the right variety for the right soils, and harvest at the right age and at the right time of year.

Crop protection

Successful farmers invest heavily in crop protection programmes, starting with good quality seedcane. Seedcane quality is determined by freedom from diseases and pests, varietal purity and germination capacity.

Efficient weed control programmes will make use of a com-



Poor distribution of fertiliser with the crop also damaged by excessive herbicide application.

bination of different strategies and will focus on preventive weed management. This will ensure that weeds do not reach the stage where they compete with the crop for available water and nutrition.

Forewarned is forearmed. Day-to-day pest and disease control remains the responsibility of every farmer. Additional surveys are therefore necessary to supplement those carried out by the local Pest and Disease teams. Early detection is the most cost-effective approach to pest and disease control.

The farm's variety disposition should consist of a well-balanced spread – this will minimise risk in the event of a pest or disease outbreak.

Keep the soil surface covered

While full trashing is unfortunately not practical in many farming operations, SASRI scientists have shown that scattering the tops after harvest (as opposed to leaving the soil bare) will result in markedly reduced rainfall runoff. Maintaining this cover on the soil surface greatly improves water conservation: scattered tops reduce evaporation from the soil surface and improve the infiltration of rainfall, particularly during heavy storms.

An additional important benefit of surface cover is that crop utilisation of top-dressed P and K is greatly improved. These nutrients



Poor distribution of tops in Eston.

are immobile in the soil, and when applied as a top-dressing, remain in the top 1 to 2 cm soil layer. Upon drying of this surface layer, the P and K are rendered unavailable to the crop. By keeping the surface covered, moisture is retained for longer in the immediate topsoil and nutrient acquisition by the crop thus enhanced.

Irrigation management

Sugarcane farmers need to think of ways to improve their irrigation operation to meet the challenge of a limited and costly water supply. A well-managed, efficient irrigation system will go a long way towards achieving this goal.

Irrigating according to a schedule will result in an appropriate amount of water being applied at an appropriate time. This ensures that most of the water applied contributes to beneficial water use and crop yields are maximised.

The detrimental effects of excessive soil water on crop growth need particular emphasis. Root growth and function are critically dependent on an adequate supply of oxygen. Excessive water results in the roots being starved of oxygen, with accompanying poor uptake of nutrients and marked reductions in crop growth. Frequent reports from growers of increased yields following a reduction in the amount of

irrigation water applied point to the importance of this aspect.

Sustainable nutrient management

Sustainable production can be assured only where nutrient removals in harvested cane are compensated for by commensurate applications in fertilisers and organic amendments. Disturbingly, “nutrient mining”, as reflected by alarmingly low soil test values, continues to restrict yields to well below field potential in many operations.

Crops need to be fertilised according to site-specific needs, which are directly related to soil properties



Poor distribution of lime.

and yield potential. Inadequate nutrition will limit yields, while excessive application of fertiliser will reduce profit margins and may lead to environmental pollution.

Soil testing is the only way to establish the nutrient levels in the soil, as well as to predict the amount of fertiliser and lime that is required.

Uniformity of product application

Unevenness in the application of products such as fertilisers, lime and herbicides invariably implies serious losses in production. Poor calibration and maintenance of herbicide applicators is a particular concern. Meticulous research is undertaken to establish correct herbicide application rates for particular soil-crop situations, and it is of the utmost importance that

guidelines are followed. A boom from which herbicide is trickling out on one side and delivering a mist spray on the other translates into potentially massive losses in production. Whilst 'over-application' of herbicide may damage the current crop, the long-term residual effects of excessive herbicide applications is an increasing concern.

Harvesting systems

As mentioned previously, a harvesting system that includes trashing at harvest has immense advantages in most situations. Where burning is practised, the cane tops should be left scattered on the field to protect the soil surface.

Under certain conditions, the use of ripeners will make a significant difference to RV. When the sugar mills open in March/April each year, cane quality is typically very low, and

ripeners can increase cane quality, thereby increasing the revenue for both growers and the millers.

The harvesting system must provide for the least possible harvest-to-crush delay, as increased delays will result in loss of RV. Participation in group vehicle scheduling systems are recommended as this will reduce delays and no-cane stops at the mill.

Particular attention should be given to infield traffic with the intention of reducing compaction. With careful planning, soil compaction can be restricted to the interrow. This will require the field layout to be planned around the wheel spacing of equipment. Thus only the interrow will be compacted and this will have a negligible effect on the crop.

Conclusion

Improved crop management certainly has the power to deliver superior yields. The best solution will be to incorporate as many Best Management Practices as possible simultaneously. This will increase the magnitude of yield response exponentially. ✓

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