



# Information Sheet

## 4.10 Registered chemicals for cane quality management: MODDUS (and other trade names)

*This Information Sheet provides important information and recommendations for the correct and optimal use of trinexapac-ethyl (MODDUS and other trade names, hereinafter referred to as "this chemical") for cane quality management in sugarcane.*

### Chemical information and mode of action

This chemical is an emulsifiable concentrate containing 250 g of the active ingredient, trinexapac-ethyl, per litre of product.

Once absorbed through the leaves, the active ingredient's mode of action leads to the inhibition of internode elongation (Figure 1), but without affecting the stalk apical meristem (growing point). Inhibition of internode elongation typically causes the formation of a compressed leaf whorl (Figure 2). Besides its effect on internode elongation, this chemical might also cause the shortening of new leaves emerging after application (Figure 2). Once the active ingredient has been sufficiently metabolised, there is a gradual resumption of normal internode and leaf elongation provided rainfall (or irrigation) and temperatures are conducive to vigorous growth.

This chemical is a plant growth regulator affecting cereals and grass species. Spray drift onto neighbouring non-target crops must be avoided. Care must be taken to minimise the drift of this chemical into natural vegetation.

Published evidence (Correia & Leite 2012 - *Scientia Agricola* 69: 194-200) indicates that accidental spraying of this chemical onto a diverse range of non-target broad-leaf species (e.g. citrus, mango, potato, common bean, soybean, cotton and sunflower) do not affect flowering and yield, unlike ETHEPHON (and other trade names), which can have severe consequences.

This chemical is not persistent in water or soil and does not accumulate in nature. However, this chemical must not be applied directly to water bodies (dams, rivers and standing surface water) because of toxicity towards aquatic organisms (fish, invertebrates and algae) that could cause long-term adverse effects in the aquatic environment. This chemical poses a very low risk to birds, bees and mammals.

This chemical can be used for improving cane quality (chemical ripening) when it is applied to immature to relatively mature, vigorously growing sugarcane.

When cane quality is at a peak following prolonged slow growth during winter, this chemical can also be used for late-season quality maintenance (typically crops harvested in November – December under South African conditions).



▲ **Figure 1.** Inhibition of internode elongation at the top of a MODDUS-treated stalk.



▲ **Figure 2.** Compressed leaf whorl and shortened leaves in MODDUS-treated cane.

## Recommendations

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Refer to Information Sheet 4.6 for detailed guidelines for selecting cane suitable for chemical ripening or late-season quality maintenance with this chemical.

### **Used for chemical ripening:**

This chemical is effective for chemical ripening of immature to relatively mature cane and good responses can be expected when the whole-stalk juice purity of cane is below 85% at the time of application. The use of this chemical could be considered if refractometer measurements reveal sufficient immaturity in the top third of stalks despite estimated whole-stalk juice purities being above 85% (caused by high maturity in lower parts of stalk). The **PurEst**<sup>®</sup> application automatically inform users of these potential chemical ripening opportunities. Refer to SASRI Information Sheet 4.7 that explains how to estimate whole-stalk juice purity on the farm with **PurEst**<sup>®</sup>.

This chemical can be applied in summer, autumn and winter provided there is vigorous growth. Cane to be harvested in August and September is highly likely to have ripened naturally due to lack of moisture and low temperatures. However, **PurEst**<sup>®</sup> testing can be conducted to confirm the maturity status of these crops, particularly when unusually mild and wet winters are experienced.

### **Used for late-season quality maintenance:**

When cane quality is at a peak following prolonged slow growth during winter, this chemical can be used for purposes of late-season cane quality maintenance (typically crops harvested in November – December under South African conditions). The **PurEst**<sup>®</sup> application automatically informs users of potential late-season quality maintenance opportunities in fields that are tested during August - October. These crops will mostly be slow-growing and at peak maturity when spraying needs to take place. Decisions to spray these crops should be made on merit and on a field-by-field basis. At spraying, the leaf canopy must be in good vegetative state (seven or more open and healthy green leaves) and soil moisture reserves (and supply of irrigation water) must be adequate to prevent drought stress for the duration of the treatment period.

**Caution: Since this chemical does not affect the stalk growing point, late-season quality maintenance can be approached with greater confidence than in the case of FUSILADE FORTE (and other trade names). However, the carry-over of crops treated with this chemical should still be avoided due to risk of side-shooting and the added risk of eldana infestation. Slow growth, caused by: a) this chemical's primary mode of action, and b) restricted ability to resume normal growth because of lack of irrigation/low rainfall once the chemical has been metabolised, can induce side-shooting despite the presence of a functioning growing point. In the unforeseen event of forced carry-over, irrigation must be reinstated as soon as possible to allow the crop to resume growth.**

### **Soil moisture requirements:**

It is essential that the supply of moisture to the crop is sufficient at spraying (crop not suffering from drought stress) and to maintain growth for at least five weeks after spraying. To achieve maximum chemical efficacy, it is recommended that the treated crop be irrigated for as long as possible after application yet allowing enough time without irrigation to avoid complications (stool damage and poor burning efficiency) during harvesting. For rainfed crops, the same conditions stipulated above apply. Crops ripened with this chemical on good soils, holding abundant soil moisture, will achieve much better results than crops grown under marginal conditions.

## Will all varieties respond to this chemical?

There might be varietal differences in response to this chemical. Screening of local varieties for their responsiveness to this chemical is in progress and variety-specific recommendations are communicated to growers as they become available (see Variety Information Sheets and the [new online variety guide](#) for details or the latest variety response table in **PurEst®**).

## Treatment options and application timing

For chemical ripening purposes, this chemical can be used on its own, or in combination with FUSILADE FORTE (and other trade names), depending on the whole-stalk juice purity of the crop at the time of application of this chemical. The combination treatment could be particularly effective in very vigorously growing crops with whole-stalk juice purities below 80% at the time of application of this chemical. However, when whole-stalk juice purities are above 80%, this chemical is recommended on its own. This would typically be the case for many rainfed crops, or for late-season quality maintenance purposes before mill closure. The application of these treatments is explained in Table 1.

This chemical is registered for application from 7 - 10 weeks before harvest. A guide to help growers determine the suitable window period of applying this chemical, as a single or combination treatment, for the different harvest months for purposes of chemical ripening or late-season cane quality maintenance is provided in the schedule on the next page. A convenient spray date guide calculator has also been incorporated within the **PurEst®** application. As a single treatment, the window period for spraying gets narrower with the anticipated reduction in growth rate during the cooler winter months. The window period for spraying widens as the anticipated growth rate increases during the warmer summer months. The optimal timing of application might very well vary depending on crop growth vigour, which is influenced by many factors including location, climate, variety, crop maturity and management. For precision-agriculture purposes, timing may be adjusted based on information gleaned from hand-held refractometer measurements, recorded at intervals between spraying and the planned harvest date. Refer to Information Sheet 4.7 for more information on the measuring method and interpretation of refractometer readings for this purpose. For the combination treatment, a fixed schedule is followed throughout the season.

**Table 1: Timing of application of this chemical when used on its own (single) or in combination with FUSILADE FORTE (and other trade names).**

Treatment	Timing of application
Single	Apply 7 -10 weeks before harvest
Combination	Apply 10 weeks before harvest followed by FUSILADE FORTE (and other trade names) 4 weeks later

## Application rates

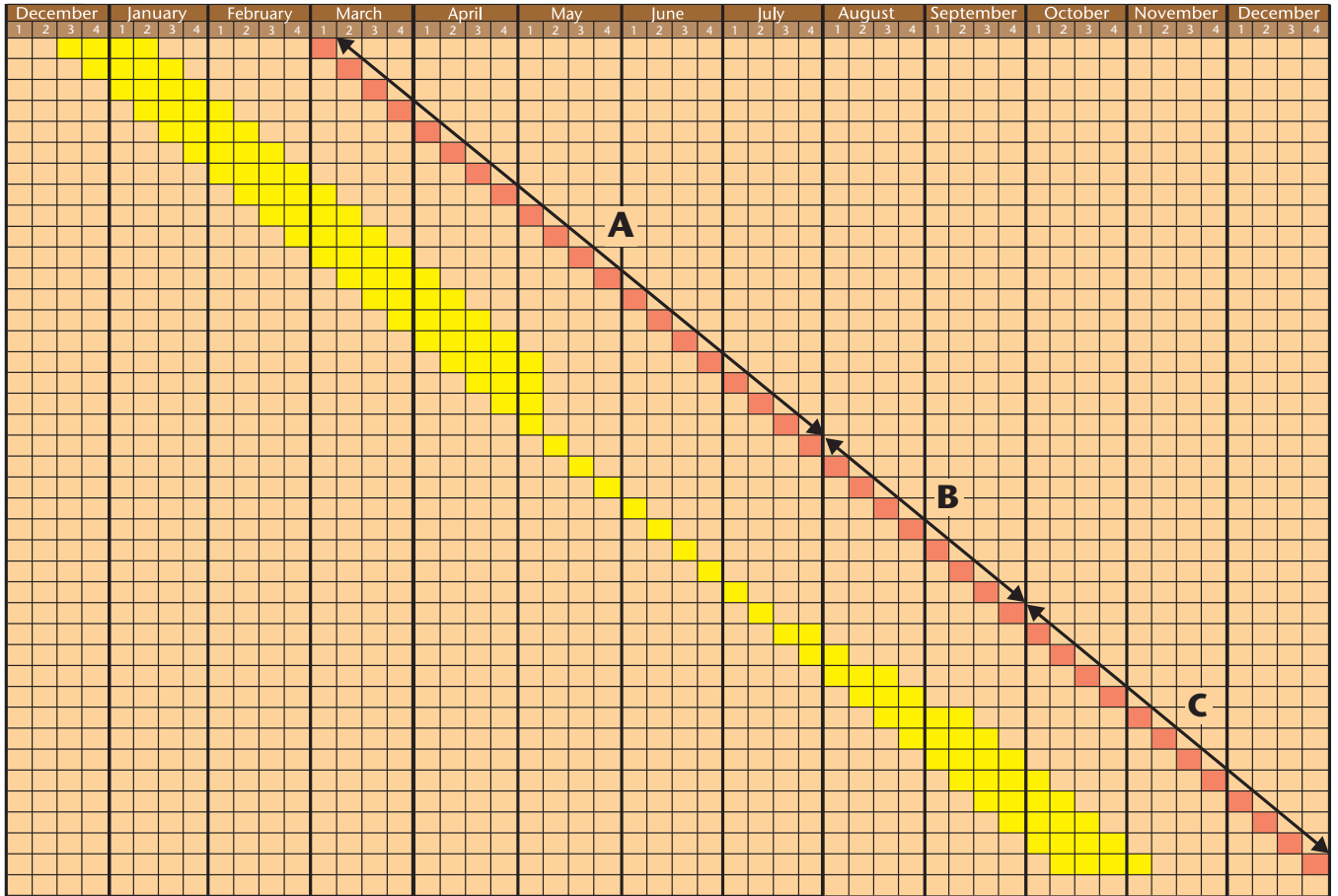
The application rates for using this chemical on its own (single) or as part of a combination treatment with FUSILADE FORTE (and other trade names) are explained in Table 2.

**Table 2: Treatment application rates and water volume.**

Treatment	Application rate	Water volume
Single	Apply at 1.0 L/ha	Apply in 50 - 200 L water/ha (ground application) or 30 – 35 L water/ha (aerial application)
Combination	Apply at 0.8 L/ha followed by FUSILADE FORTE (and other trade names) 4 weeks later at registered rates (see Information Sheet 4.9)	

### Timing of individual treatment

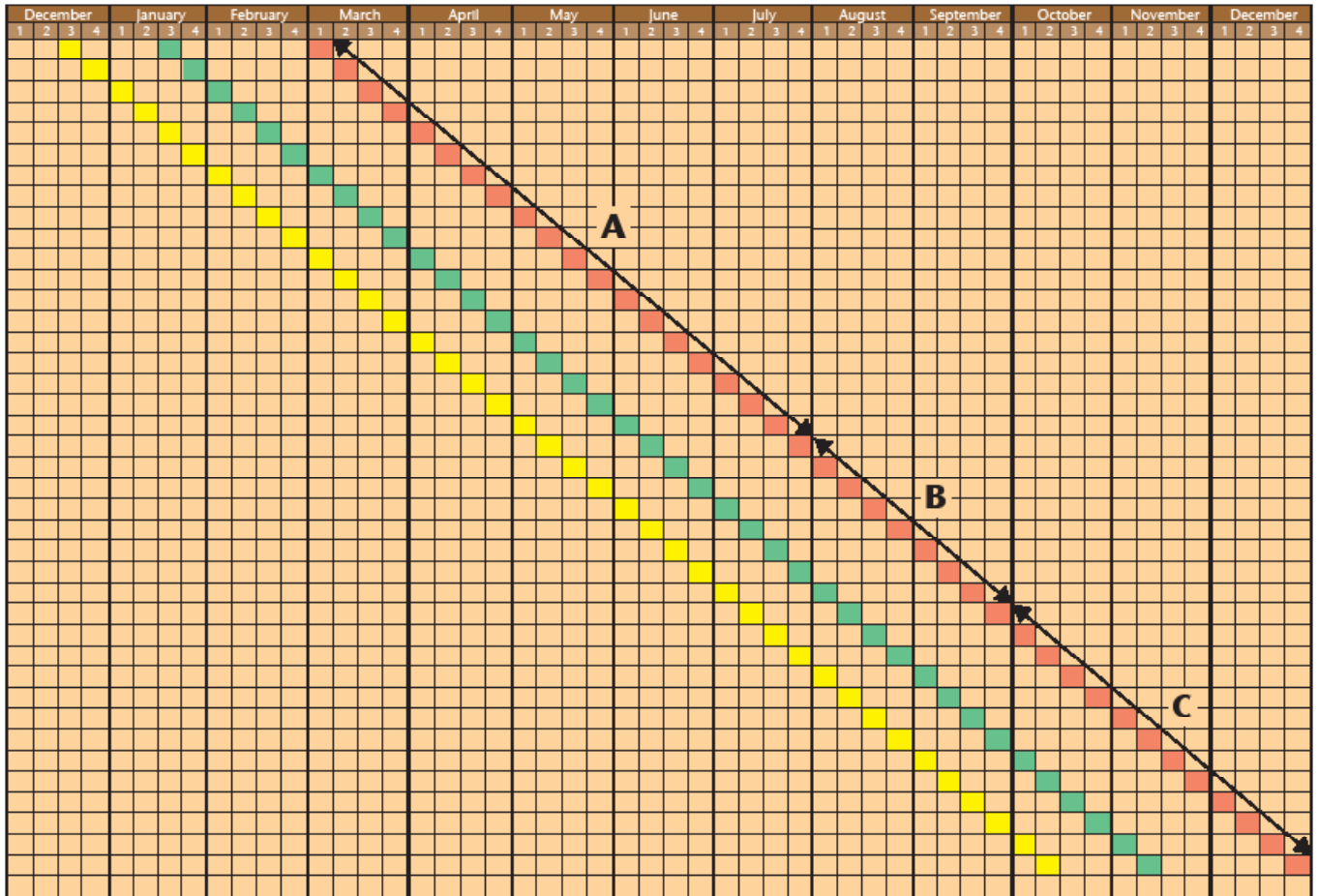
**Week of harvesting**
 **Week of Moddus (and other trade names) spraying**



**Harvest weeks falling during time-period indicated by arrows:**  
**A** = Chemical ripening period (to improve quality)  
**B** = Only apply chemical on merit (following maturity assessment)  
**C** = Late-season quality maintenance period (to maintain high quality)

### Timing of combination treatment

- Week of harvesting
- Week of Moddus (and other trade names) spraying
- Week of Fusilade Forte (and other trade names) spraying



Harvest weeks falling during time-period indicated by arrows:  
**A** = Chemical ripening period (to improve quality)  
**B** = Only apply chemical on merit (following maturity assessment)  
**C** = Late-season quality maintenance period (to maintain high quality)

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