Testing paper pots and plastic inserts for a *Eucalyptus* clone and seedling on a poor site at Dumbe

October 2024

Ullrich Hechter

Paper pot versus plastic insert on a poor site

1. Introduction
2. Research objectives
3. Research methodology
4. Early results for Dumbe (1 year)
5. Take home points

1. Introduction:

1. Forestry companies aim to achieve at least 90% survival at establishment.
2. Mechanisation.
3. How do we improve robustness of plants?

2. Research objectives:

1. To test the robustness of paper pots in terms of initial survival using “single-pass planting” with semi-mech planting equipment to ascertain the potential to fully mechanise planting in the future.

2. To evaluate tree survival and growth for two different root plug types to determine which root plug combination is the best suited for the implementation of “single-pass planting” (>95 % survival @ 3 months)

3. To determine which root plug type will be best suited to fully automated planting in the future.

3. Research methodology

1. Factors: 2 x 2 factorial + additional control
   a) Insert type: Paper Pot vs. Unigro 128 inserts (Sutherland media)
   b) Control release fertiliser: Yes vs. no
   c) Control: Unigro 128 with Mondi media + no fertiliser
2. Measurements:
   a) Growth (GLD, HT and DBH)
   b) Survival assessments
   c) Derived variables (volume, basal area)

4. Results:

Observations:

1. Paper pot root plugs are more consolidated compared to plastic insert root plugs.

2. Paper pot root plugs retain moisture better than plastic insert root plugs.

3. There are more active white roots in the paper pot plugs compared to plastic insert plugs.

4. Paper pot root plugs are hardier than plastic insert root plugs and can withstand more mishandling, especially using semi-mechanised and fully mechanised planting systems.

5. It is more efficient to plant with paper pot plants (less handling involved).

Unconsolidated plastic insert root plug

5. Three-month results for Corrected biomass index

1. Corrected biomass index (BI_C) takes GLD, Height and Survival into account.
2. In terms of BI_C for both the eucalypt clone and seedling (*E. dunnii*), the paper pots performed significantly better than plastic inserts. **(Figures 1 & 2)**
3. The addition of control release fertiliser resulted in a significant improvement in BI_C in the *E. dunnii* seedlings, but not in the eucalypt clone. **(Figure 3)**

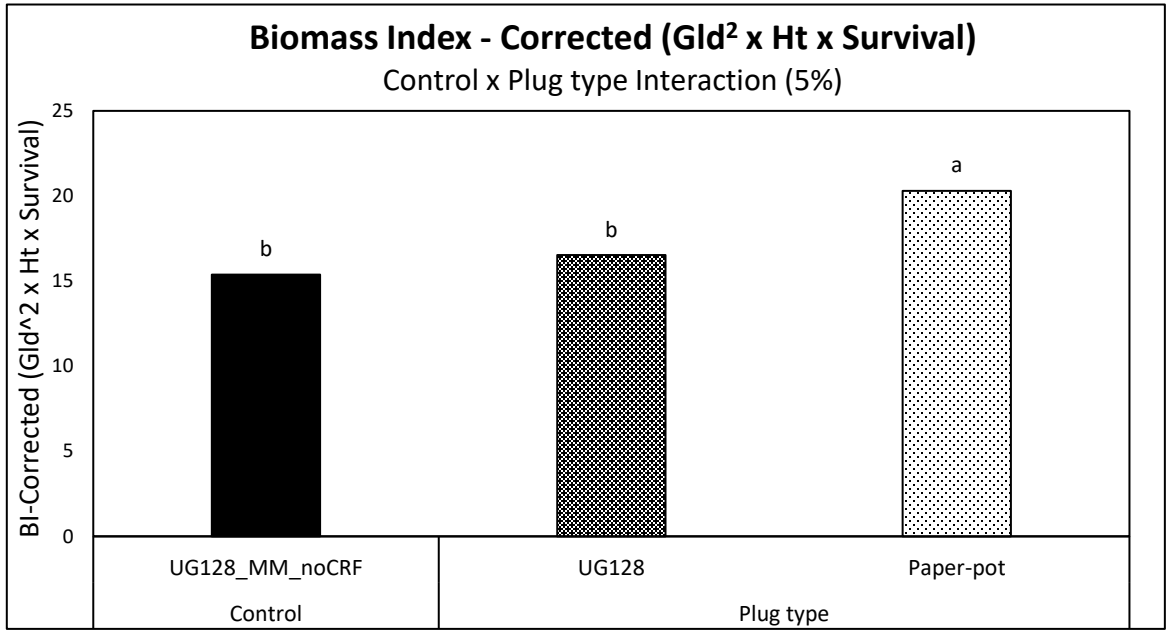

Figure 1. Three-month corrected BI for **<u>eucalypt clone</u>** at Dumbe (Plug type)

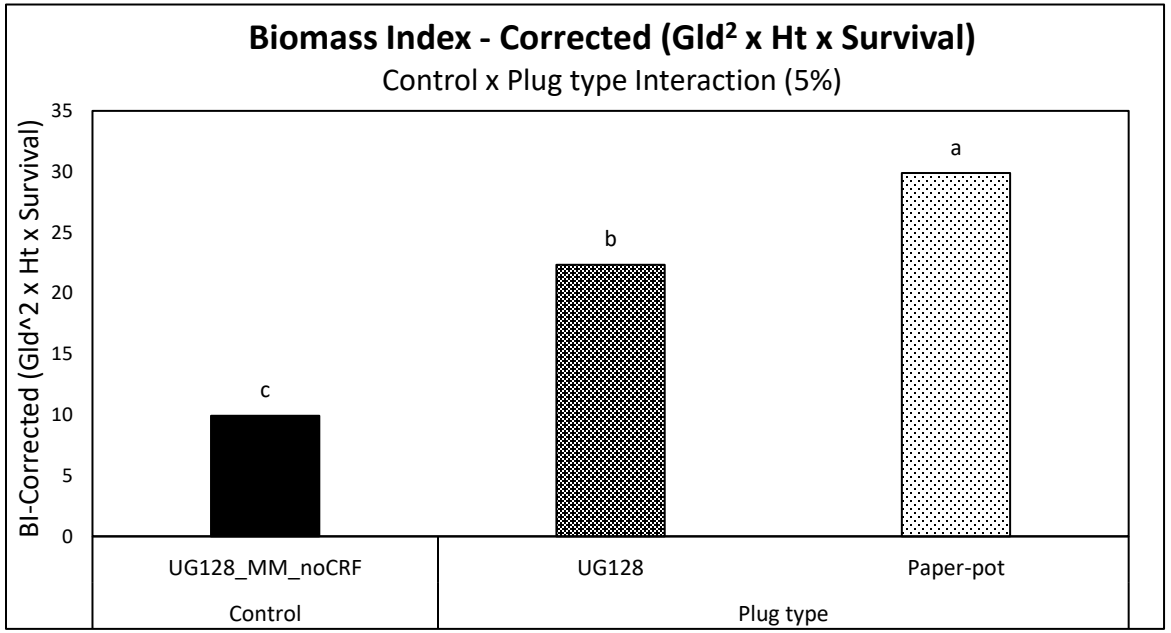

Figure 2. Three-month corrected BI for **<u>eucalypt seedling</u>** at Dumbe (Plug type)

5. Three-month results for Corrected biomass index (Dumbe)

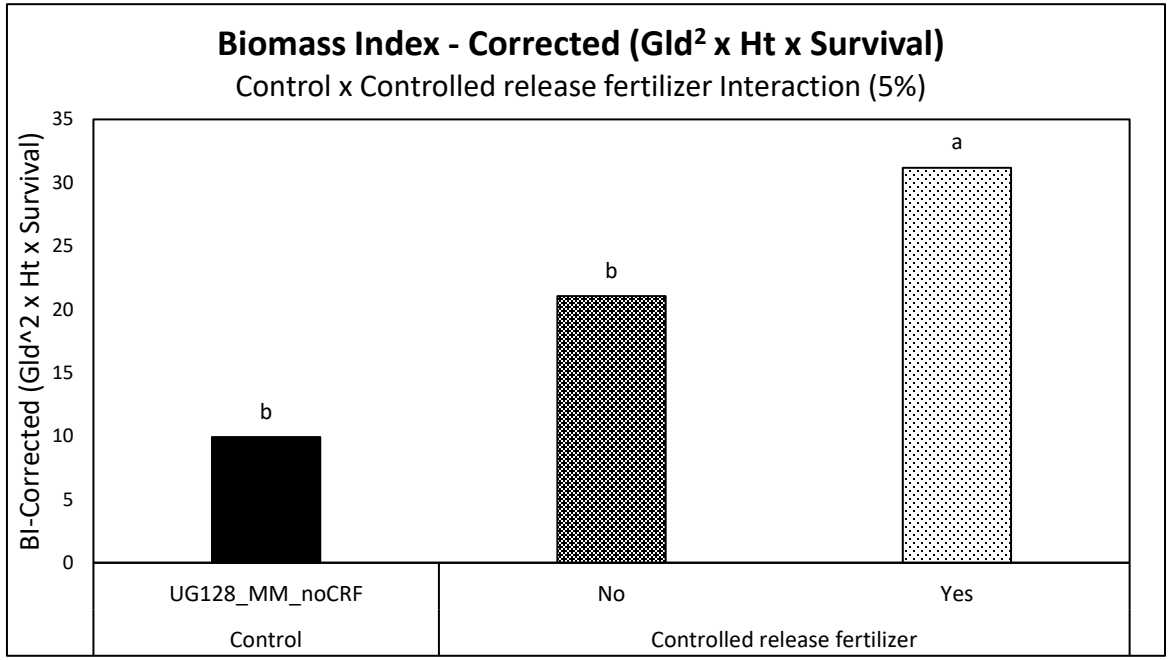

Figure 3. Three-month corrected BI for eucalypt seedling at Dumbe (CRF)

6. Twelve-month results for *Eucalyptus* clone

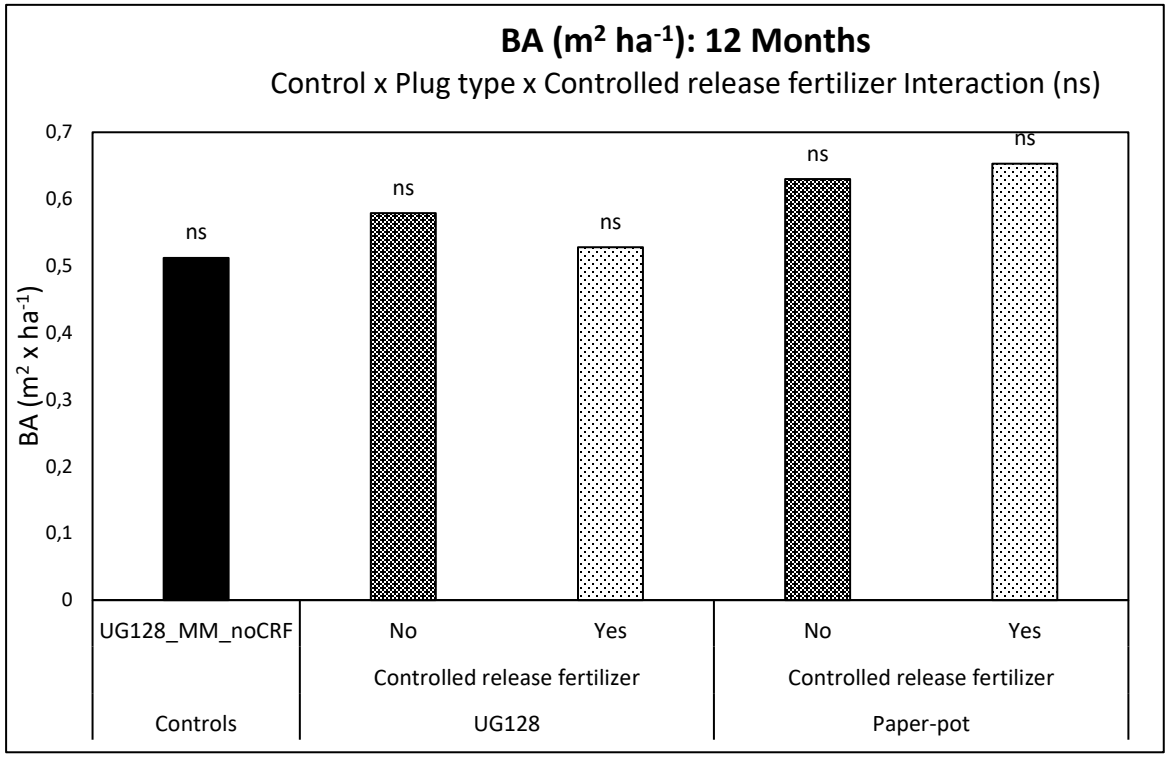

Figure 4. Twelve-month BA for eucalypt clone

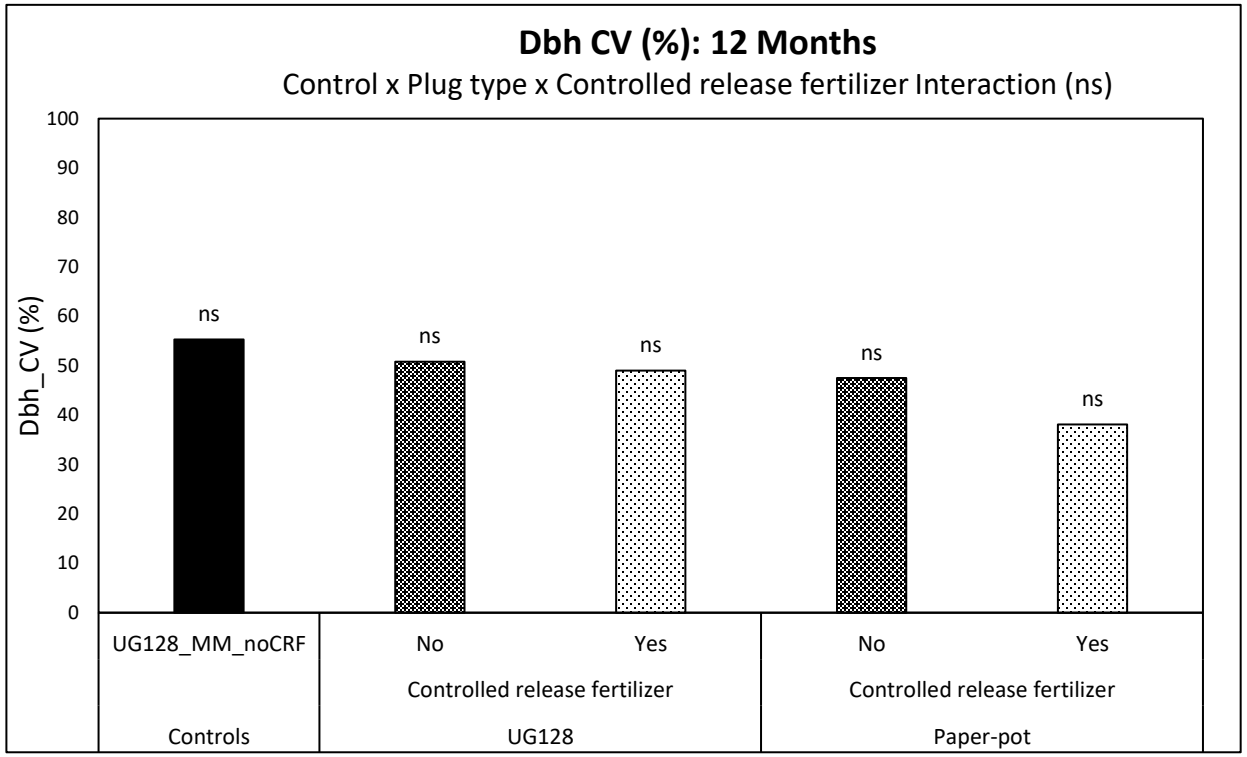

Figure 5. Twelve-month DBH CV for eucalypt clone

6. Twelve-month results for *Eucalyptus* seedling

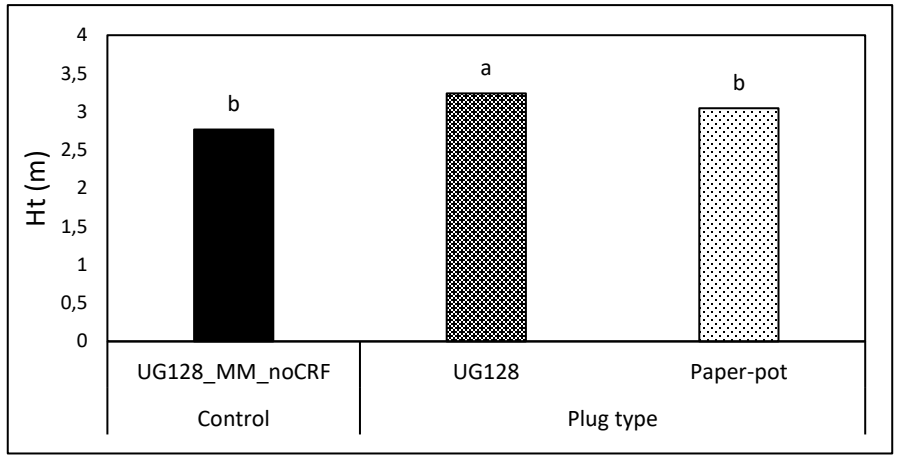

Figure 6. Twelve-month HT for eucalypt seedling

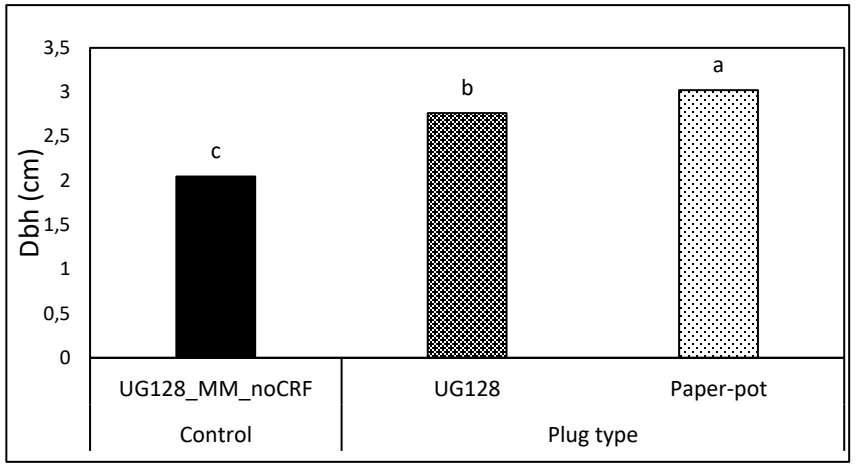

Figure 7. Twelve-month DBH for eucalypt seedling

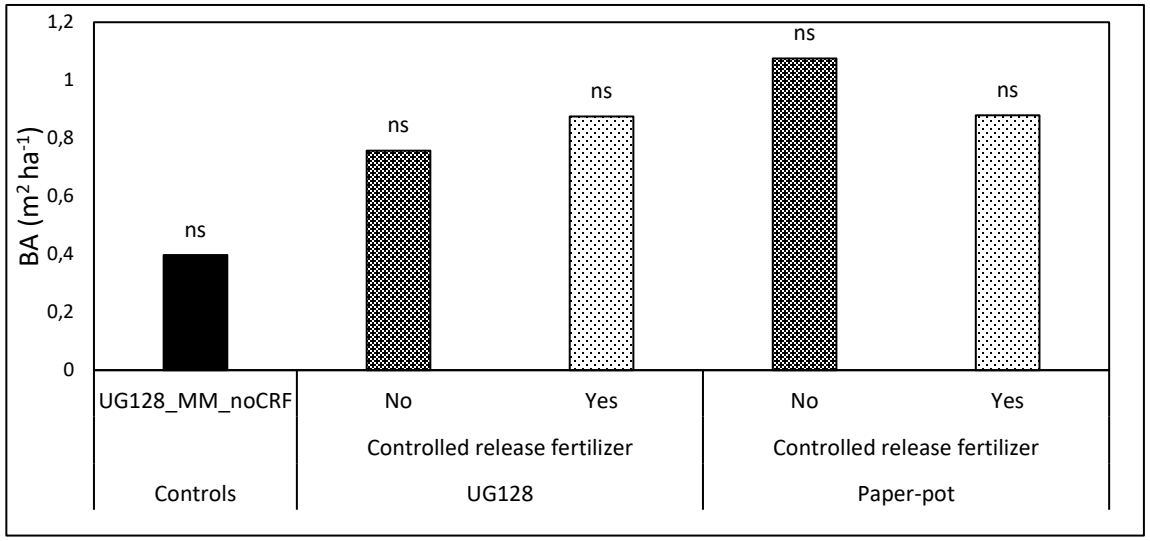

Figure 8. Twelve-month BA for eucalypt seedling

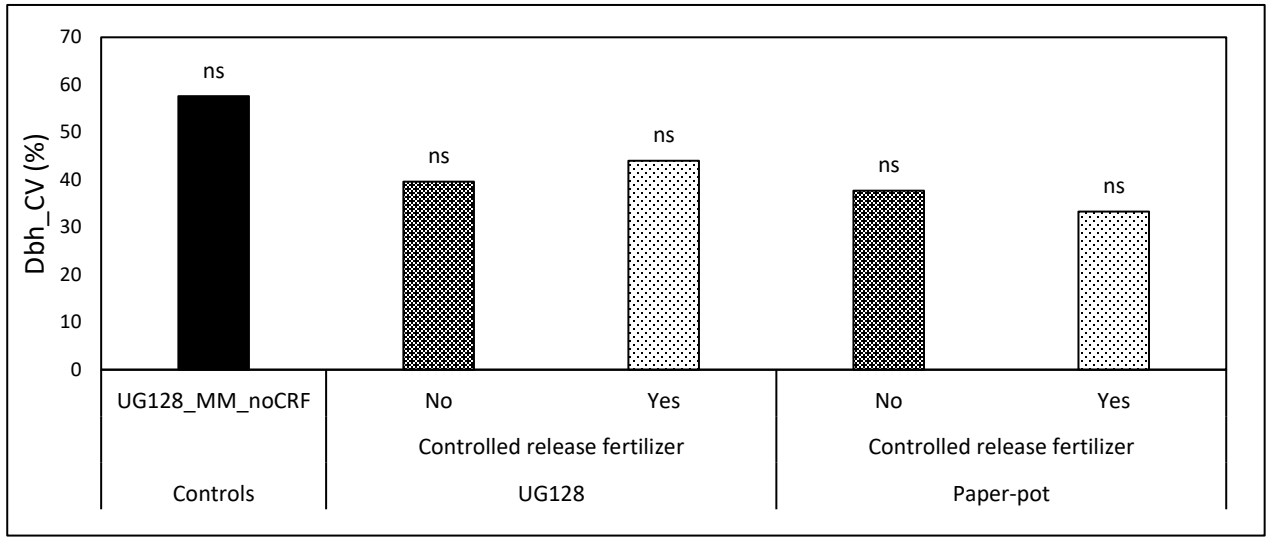

Figure 9. Twelve-month DBH CV for eucalypt seedling

6. Take home points:

1. There are potential benefits of using paper pots for re-establishment purposes.
2. Determining final yield gains through the use of paper pots and control release fertiliser requires monitoring for at least a rotation, however, early results (canopy closure) may provide an indication of the potential improvement at rotation end.
3. Three-month results at Dumbe show that paper pot plugs outperform Unigro 128 plugs in terms of initial survival and growth which in turn promotes “single-pass planting”. The reasons for this may lie with the improved survival of paper pot plants due to better quality root plugs and improved robustness.
4. Twelve-month results show that paper pot plugs result in improved growth and uniformity compared to Unigro 128 plugs, (significant for seedlings and not significant for clones (This, however, is still important)).
5. We are still in the initial phase of this research and will continue to replicate this work over more sites over time.
6. The addition of control release fertiliser in the nursery seem to have a positive impact in terms of early growth. Continuous monitoring is necessary to see whether these improvements are carried through to rotation end.

Thank you

Forward-looking statements disclaimer

This document includes forward-looking statements. All statements other than statements of historical facts included herein, including, without limitation, those regarding Mondi's financial position, business strategy, market growth and developments, expectations of growth and profitability and plans and objectives of management for future operations, are forward-looking statements. Forward-looking statements are sometimes identified by the use of forward-looking terminology such as 'believe', 'expects', 'may', 'will', 'could', 'should', 'shall', 'risk', 'intends', 'estimates', 'aims', 'plans', 'predicts', 'continues', 'assumes', 'positioned' or 'anticipates' or the negative thereof, other variations thereon or comparable terminology. Such forward-looking statements involve known and unknown risks, uncertainties and other factors which may cause the actual results, performance or achievements of Mondi, or industry results, to be materially different from any future results, performance or achievements expressed or implied by such forward-looking statements. Such forward-looking statements and other statements contained in this document regarding matters that are not historical facts involve predictions and are based on numerous assumptions regarding Mondi's present and future business strategies and the environment in which Mondi will operate in the future. These forward-looking statements speak only as of the date on which they are made.

No assurance can be given that such future results will be achieved; various factors could cause actual future results, performance or events to differ materially from those described in these statements. Such factors include in particular but without any limitation: (1) operating factors, such as continued success of manufacturing activities and the achievement of efficiencies therein, continued success of product development plans and targets, changes in the degree of protection created by Mondi's patents and other intellectual property rights and the availability of capital on acceptable terms; (2) industry conditions, such as strength of product demand, intensity of competition, prevailing and future global market prices for Mondi's products and raw materials and the pricing pressures thereto, financial condition of the customers, suppliers and the competitors of Mondi and potential introduction of competing products and technologies by competitors; and (3) general economic conditions, such as rates of economic growth in Mondi's principal geographical markets or fluctuations of exchange rates and interest rates.

Mondi expressly disclaims

a) any warranty or liability as to accuracy or completeness of the information provided herein; and

b) any obligation or undertaking to review or confirm analysts' expectations or estimates or to update any forward-looking statements to reflect any change in Mondi's expectations or any events that occur or circumstances that arise after the date of making any forward-looking statements,

unless required to do so by applicable law or any regulatory body applicable to Mondi, including the JSE Limited and the LSE.