Table 3
Nutritive element
Lignin %
Ash %
Acid detergent fibre (ADF) %
Neutral detergent fibre (NDF) %
Protein %
Moisture %
resulting in increased dry material intake and subsequent higher milk production.

Table 4
Lucerne grade
Retail price* of lucerne hay (rand/l)
Prime          2 700
Grade 1         1 500
Grade 2        -900

NLT lucerne-grading certificate is compiled following an index that indicates the grade of the hay as well as the proportion of the various nutritive elements. The NLT lucerne hay quality index is shown in Table 2. The higher the index, the higher the quality. Hay with a quality index of 104 or more is categorised as Prime Grade. A value of between 97 and 103 is categorised as Grade 1 hay and is of average nutritive value. Grade 2 (93 to 96) has the lowest quality index and may contain foreign material such as grass. The NLT lucerne certificate shows the dry material concentration of specific nutritive elements, as shown in Table 3:

- **Quality control**
  Bales that have a moisture content exceeding 16%, mouldy odour, signs of water damage and contain foreign materials such as bale twine are identified. Mouldy bales and bales containing materials pose a threat to animal health, and bales with a high moisture content could catch fire when they start to ferment.

Dr Gerrie Scholtz obtained his PhD, titled, ‘A Grading System for Medicago sativa hay in South Africa’ from the University of the Free State and used the Agriculture Modelling and Training Systems’ cattle programme, based on the Cornell Net Carbohydrate and Protein System, to simulate and predict milk production in line with different grades of lucerne hay added to the dairy cows’ diet. Predictions were that a high-producing milk cow could produce 4% more milk per day when fed 10kg Prime Grade lucerne hay instead of the same amount of Grade 1 hay. The relative monetary comparison of Prime Grade with Grade 1 and Grade 2 is shown in Table 4.

- Annemie Coleman  

**BIO MONITOR**

Mutated gene to extend soya uses

Soya beans are being planted in a variety of environments. Discovery of the gene that determines seed coat hardness opens the way for use in harsh climates. It also determines the gene’s association with increased calcium content.

Cultivated soya beans generally have softer, permeable seed coats that enable rapid moisture absorption 15 minutes after planting, resulting in enhanced germination and emergence. By contrast, wild soya bean species have extremely hard seed coats, and the seed may take weeks or even months to germinate. This makes commercial use unattractive and complicates cross-breeding wild soya with cultivated varieties in domesticating wild species. But such hard seeds can remain viable for many years in storage, which may be useful in severe climates. The softer seed coat is postulated to have arisen from ancient farmer selection in wild species, but the genetics remained unknown until recently.

Researchers at Purdue University in the US used molecular techniques to locate the gene, GmHsI-1, which had undergone a minute mutation in wild soya. Conventional cross-breeding to alter hard seed coat wild soya into softer, permeable types paves the way for domestication that will provide new useful genes in future varieties, extending soya bean biodiversity.

Further altering the gene can help to produce varieties with harder seed coats for hot, tropical regions where seed viability rapidly declines.

The researchers also found that the mutated gene is associated with calcium content in the seeds. The research will extend to identifying the genes involved in calcium uptake and perhaps other minerals, to enhance soya nutritional quality.

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