

Devon & Cornwall Soils Alliance

Building capacity and capability in soils advice across Devon and Cornwall

Under-sowing maize trials – Technical note

Cornwall Field trials: Soil assessments undertaken with farmers in the winter identified compaction and run-off from maize stubbles. Following this, advice was given to farmers regarding location and field selection, maize variety choice, timing of maize planting and post-harvest management, with further impartial advice provided from the Maize Growers Association as part of the maize charter advisory visit and report.



Figure 1. Unmanaged Maize stubble over winter

Conventional options to reduce run-off over winter are to too rough cultivate the maize stubble to break up flow pathways or establish a following crop or cover crop. The option of under-sowing the maize crop can help avoid bare soils being exposed over winter after the maize is harvested. Post-harvest is usually a critical time for soil management as there can be a limited window (or no window at all) to establish the following crop.



Figure 2. Rothamsted research - run-off from land uses

Methodology: Under sowing maize generally requires the use of a specialist interrow drill, which is used when the maize is already established at the 4-5 leaf stage, often when the plant is around 25 -30cm tall. The seeds (usually rye grass) are drilled between the rows so that when the maize is harvested, the following crop is already established, and no additional cultivations are required. Trials with this method have indicated a good establishment and percentage coverage of rye grass, when compared to a broadcast seed drill; Wye & Usk trials <https://www.wyeuskfoundation.org/improving-maize-practices>



Figure 3. (left) Specialist interrow drill at the 4-5 leaf stage, (right) a few weeks post drilling rye grass is emerging

Costings:

- Approx.: £30/ha for a specialist interrow drill – based on contractor rates
- Grass seed approx. £45/ha based on 15kg/ha of seed

Findings: The timing of the interrow drilling is key and the window for this can be short when the crop is growing quickly and there is a risk of rain and wet conditions, causing the maize to sag but also a risk of low moisture which may slow grass development. As under-sowing requires a specialist drill it can also be costly. However, the grass established post-harvest will have a value for grazing the following spring, which can help to offset the establishment costs.

Key points

- ⇒ Potential for continuous ground cover
- ⇒ Rye grass proven cover crop
- ⇒ Need for inter-row drill
- ⇒ Other field mitigation factors still essential
- ⇒ Additional cost drill cost offset from use of grass crop in spring

Four of the farms used rye grass, whereas one of the farms opted for a paddock mixture. These fields were monitored for establishment, there was some initial variation between fields, but all the rye grass established relatively well, with only the paddock mix being slow to get going. Post-harvest the rye grass was already established and with the increased light was able to increase its area of coverage in the field. Again, the paddock mix struggled and was slower to establish compared to the rye grass.

Farmer observations & feedback:

Feedback from farmers was generally positive, two of the farms were arable and therefore there was a not a grazing benefit, however both reported that the grass had established well and that they would consider undertaking this again, as they saw the benefit of stabilising soils and retaining valuable nutrients over the winter. The main barrier to wider application was the associated cost of using the specialist drill during establishment and potential limited local availability.



Figure 4. Maize stubble with the rye grass already well established to the left-hand side, right rye grass established in the autumn after interrow sowing.

conditions it is still likely to pose a risk, although the added grass should reduce this risk and provide additional benefits.

Summary: Under-sowing does not mitigate the other major considerations that should be taken first such as suitability of the land, soil type, slope, proximity to water, soil condition, climate, variety choice and establishment date. Also, establishing a cover crop does not exempt it from regulation and if the field is compacted during poor harvest

conditions it is still likely to pose a risk, although the added grass should reduce this risk and provide additional benefits. Headlands and well tracked areas post-harvest may also need to be sub-soiled to help remove the compaction. Under-sowing may however provide an additional useful option for post-harvest management and ensure that there is a near continuous crop cover during the Autumn and winter to reduce soil loss and trap and absorb nutrient run-off.