6.0 CONCLUSIONS

The AESA Soil Quality Program tested two field methods for determining soil organic matter using soils from across Alberta. The objectives of this study were to test the methods proposed by Weil et al. (2003) and Bowman (1997) on Alberta soils to determine the reliability of the procedures by comparing them to results obtained through lab analyses and to determine if either method would make a significant contribution to the Soil Quality Test Kit.

We found that the method developed by Weil et al. (2003) was able to accurately detect soil organic matter when compared to lab results. However, the results exhibited a weak relationship between light fraction carbon and active carbon. The procedure outlined by Bowman (1997) provided results showing a reasonably strong relationship between the soil organic matter values obtained through lab analysis and the estimated soil organic matter values.

Based on the findings of this study either field method could potentially make a positive contribution to the USDA-ARS Soil Quality Test Kit for use in Alberta if used by those familiar with soil analyses. For those unfamiliar with procedures related to soil analyses, both field methods required the use of materials, including chemicals and measuring devices that could not easily be utilized without the aide of an experienced individual. Even with the chemicals and calculations provided, the amount of materials and background knowledge needed for each test may be daunting to an inexperienced user.

Therefore, both procedures would need to be adapted to ensure that the methodologies are as simplified as possible. The Weil et al. (2003) method to determine active C would need to be altered so that a generalized standard curve would be provided to the user to eliminate extensive calculations. The method proposed by Bowman (1997) would need to be changed so that standards are provided. Both methods involve making chemicals, which could introduce inconsistency if measured incorrectly or could be a discouraging aspect for the user. To eliminate these concerns it would be best to provide the user with the necessary chemical already mixed. Pre-prepared solutions also reduce the number of materials necessary to carry out both procedures in the field, increasing the ease of operations. Although the method to determine active C was more costly, it provided accurate results when measuring soil organic matter (R^2=0.82) and was quantitative, which reduces user bias. The qualitative basic EDTA method was less expensive and, although not as accurate as the active C method, still provided results consistent with those of the lab (R^2=0.67).

Both field methods have the capability to become an integral part of the USDA-ARS Soil Quality Test Kit for use in Alberta to measure soil organic matter. Further testing and modifications of both methods are necessary to ensure that they are straightforward and effective for the potential user.

7.0 REFERENCES

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