

Impact of tillage practices on dry soil aggregate distribution in different soil types in Austria



Tigist O. WOLLELO and Andreas KLIK

Institute of Hydraulics and Rural Water Management, University of Natural Resources and Applied Life Sciences Vienna, Muthgasse 18, A-1190, Vienna Austria, tigistder@yahoo.com

Introduction

- Intensive tillage is one of the main causes of soil degradation in agricultural lands (Lal 1994).
- The main benefit of Conservation agriculture is to preserve the soil in more or less semi-natural conditions as soil disturbance by cultivation is minimized and chemical and physical depletion are reduced (Kertesz, 2004).
- Several studies showed that conservation tillage improved soil aggregation even within short-term application (D'haene et al., 2008, Coppens et al., 2006).
- Dry aggregate size distribution could be considered to represent the actual state of soil aggregation and soil structure

Objectives

- To investigate the impact of tillage practices on dry mean weight diameter (DMWD) in different soil types
- To determine the range of dry aggregate sizes that are affected by tillage practices in spring and autumn.

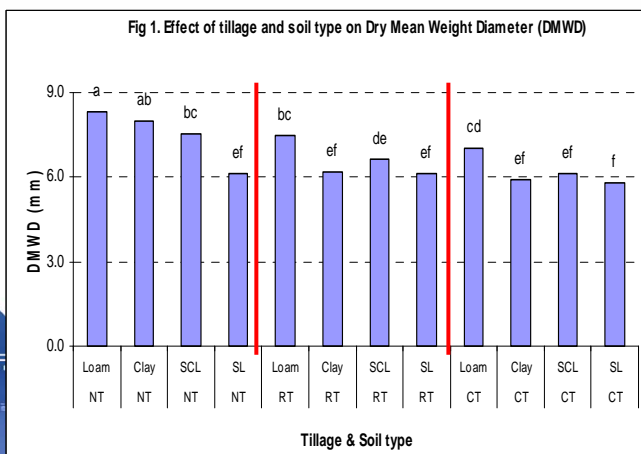
Methodology

- This study is part of a long-term conservation agriculture experiment being conducted in 5 different sites in Eastern Austria
- The soil physicochemical characteristics and some meteorological data are given in Table 1.
- The treatments were 1. Conventional tillage (CT), 2. Reduced Tillage, 3. No Till (NT) with three replication
- Disturbed composite Soil samples were collected from the top 10 cm and air dried
- 3.5 Kg of air dried soil was sieved for each plot using 22.4, 8, 4, 2, 1 mm sized sieves

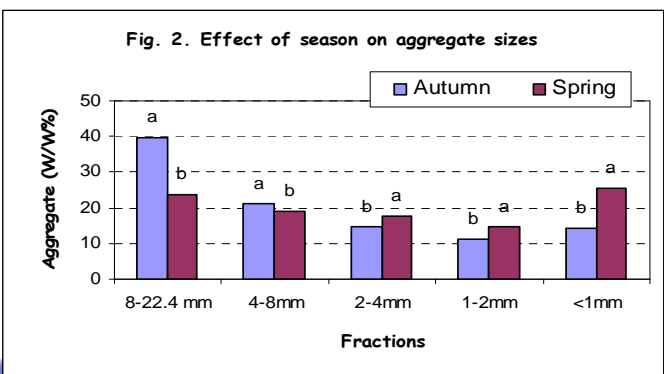
Study Sites	Av. annual T (°C)	Av. annual Rainfall (mm)	Sand (%)	Silt (%)	Clay (%)	Soil texture	EC	pH	Start of CA
Kirchberg	9.1	730	53	27	20	Sandy clay Loam (SCL)	266	6.6	2007
Mistelbach	9.6	645	8	68	24	Silt loam (SL)	179	7.9	1994
Pixendorf	9.4	685	25	58	17	silt loam (SL)	173	8.0	1999
Pyhra	9.4	945	43	37	20	Loam (L)	73	7.0	1994
Tulln	9.4	685	13	37	50	Clay (C)	195	7.9	1999

Result

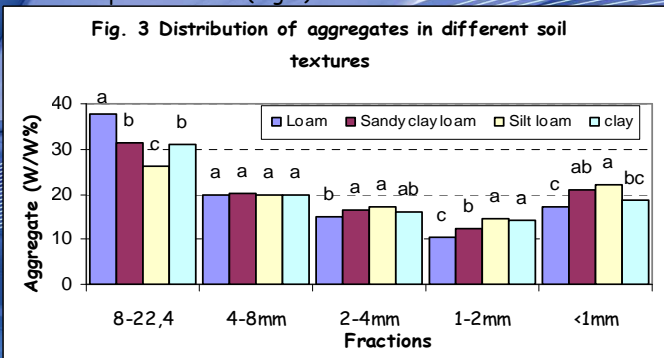
- NT has significantly higher ($P < 0.0001$) DMWD followed than RT and RT has also significantly higher DMWD than CT
- NT had significantly higher DMWD in Loam and Clay soils
- Tillage had no significant effect on DMWD of Silt loam soils



In Autumn, there are significantly higher amount of larger aggregates (Fig 2)



Soil type has effect on the different aggregate fractions except on 2-4 mm (Fig 3)



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