

## INTRODUCTION

❖Mycorrhizae is a form of mutualistic symbiosis between plant root and fungi. Arbuscular mycorrhizal (AM) fungi colonize the root of the most agricultural crops and weed and in general, with almost 80% of plant on earth.

❖Mycorrhizal symbiosis improve plant growth by enhancing nutrients (Sally et al., 2011) and water uptake, resistance to drought and disease resistance and plant protection against environmental stressors.

❖Agricultural management practices like tillage , cover crop , crop rotation effect the distribution and abundance of arbuscular mycorrhizal fungi (AMF) in soil.

❖Cover crops provide benefits such as: protect soil from erosion (wind and water), reduce weed growth, increase soil organic matter, improve soil properties, and increase biomass and diversity of mycorrhizal fungi (Njeru et al., 2014) and other soil microorganisms (Wagner et al., 1995, Zablotowicz et al., 1998) .

## OBJECTIVES

❖Examine mycorrhizal formation in Barley in agricultural soils in the Bighorn Basin, and amount of AMF biomarker PLFA (16:1w5) in soil.

❖Determine the effect of use of arbuscular mycorrhizal cover crops on the amount of arbuscular mycorrhizal fungi in these agricultural soils.

❖Quantify the effects of cover crop use on arbuscular mycorrhizal fungal assemblages, soil aggregate structure and soil carbon pools

## MATERIAL AND METHODS

❖The analysis was carried using a two group t test to observe significant deference between fields having cover crop and some without cover crop; fields in this study are the replicates. Research was being conducted in five agricultural fields in Bighorn Basin.

❖Regression analysis used to examine relationship between indicators of AMF activity (AMF biomarker PLFA) and soil quality indicators , soil organic carbon (SOC), and soil aggregates.

❖The proportion of soil as stable aggregates (soil aggregation) was determined using the method of Six et al. (1998).

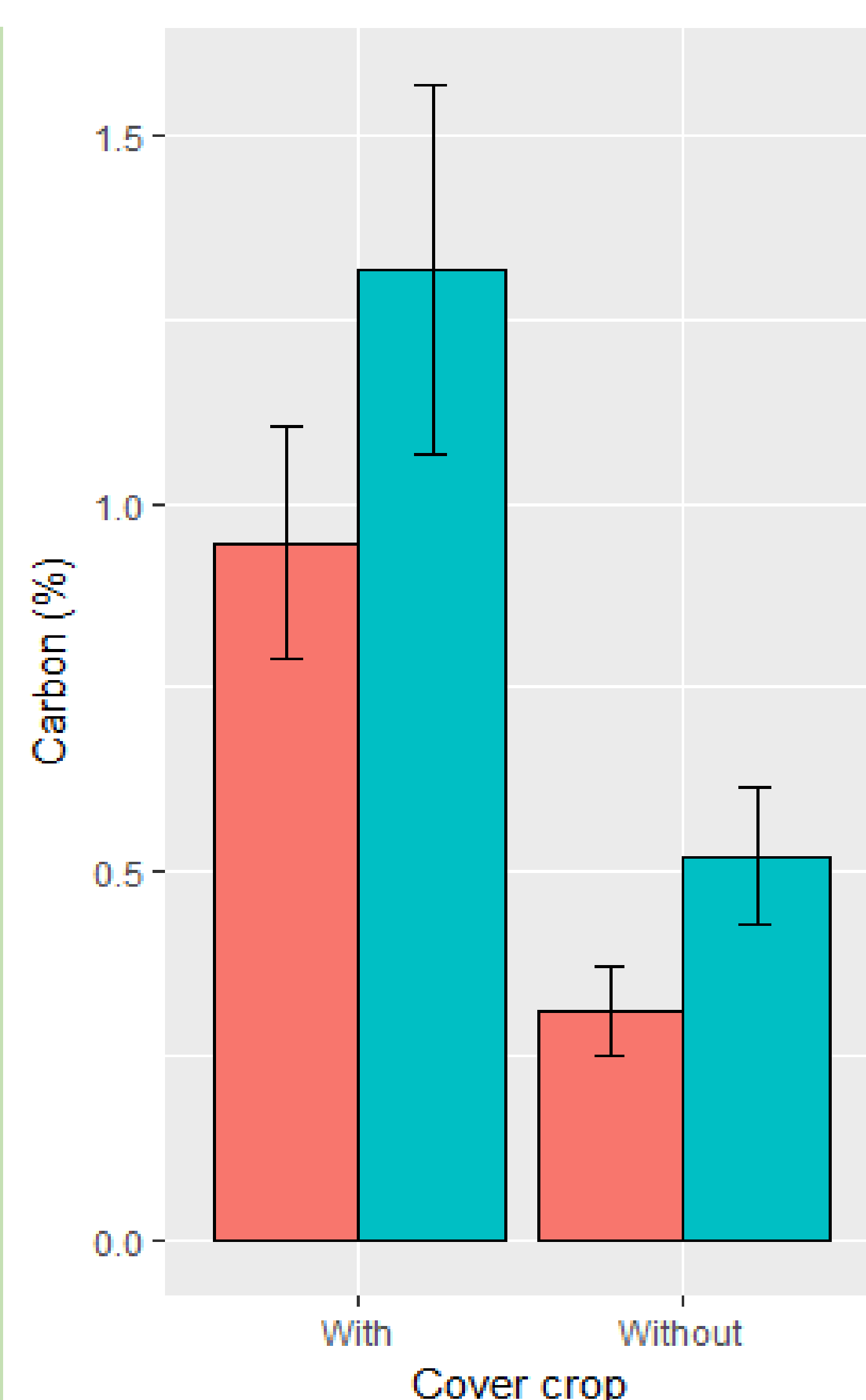


Fig. 1. Total carbon and organic carbon (%) under cover crop and no cover crop in Bighorn Basin fields.

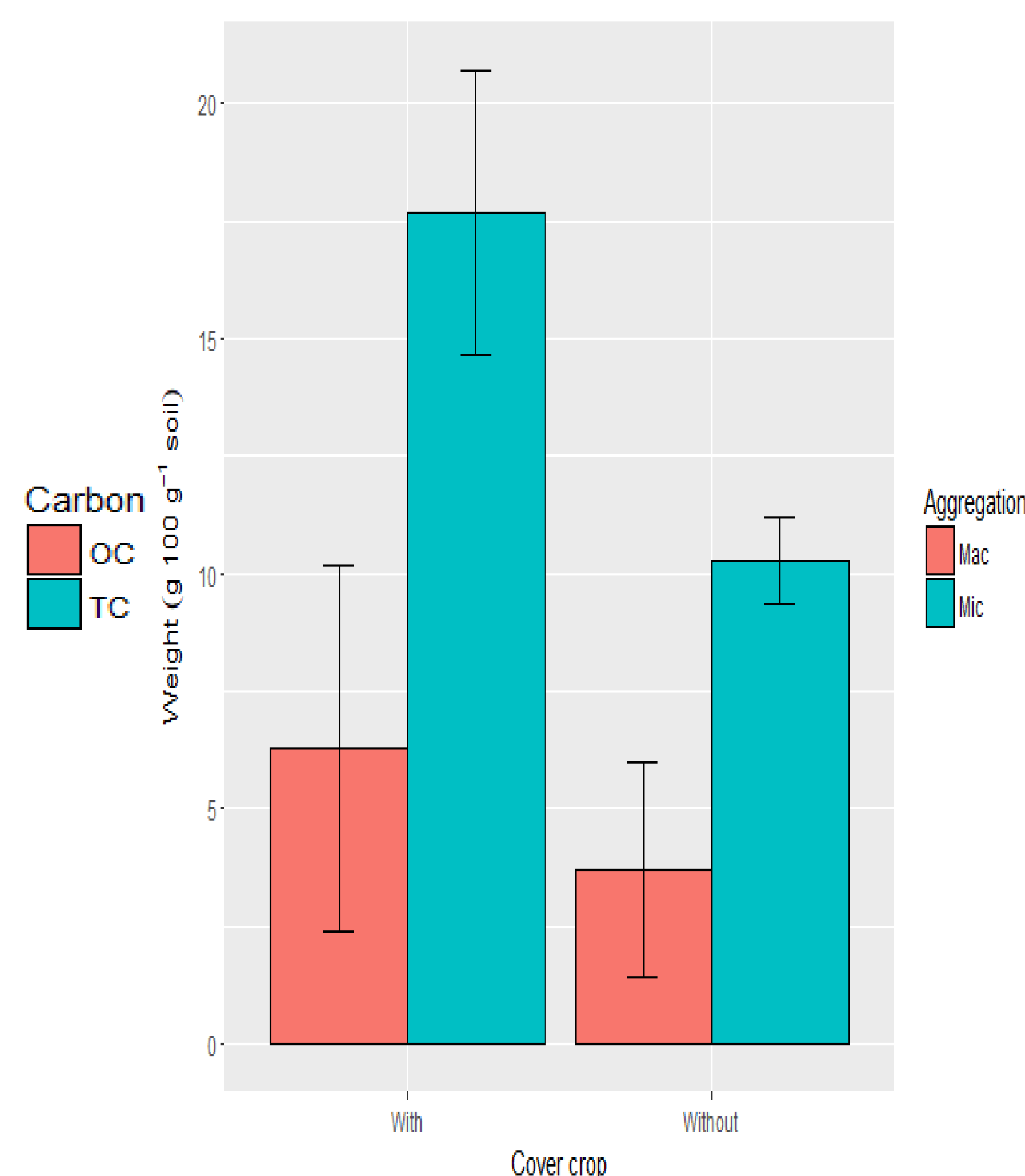


Fig. 2. Proportion of macro and microaggregates (g 100g<sup>-1</sup> soil) under cover crop and no cover crop in Bighorn Basin fields.

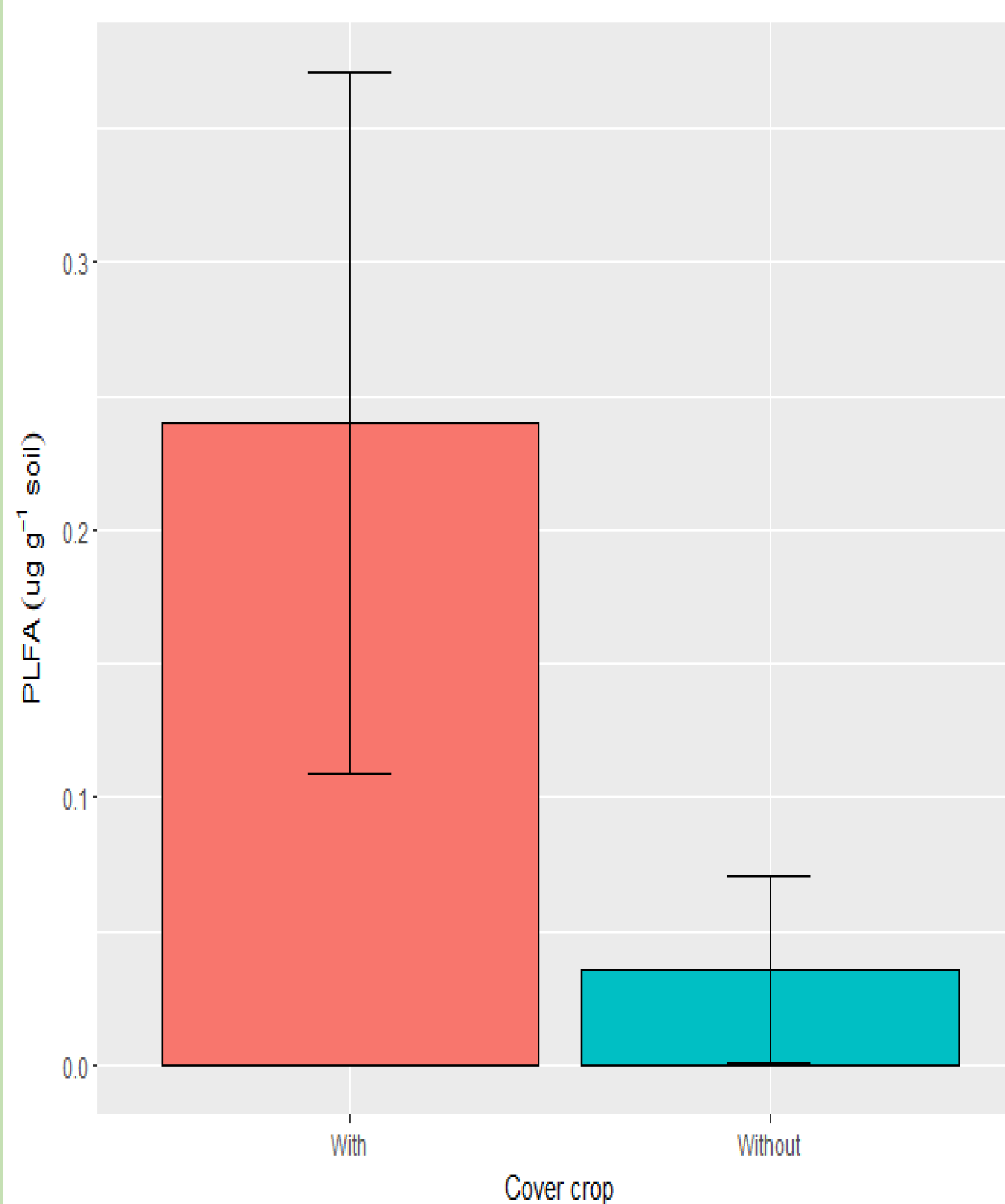


Fig. 3. AMF Biomarker PLFA (16:1w5) (µg g<sup>-1</sup> soil) under cover crop and no cover crop in Bighorn Basin fields.



Fig. 4. Phospholipid fatty acid (PLFA) extraction in the laboratory.

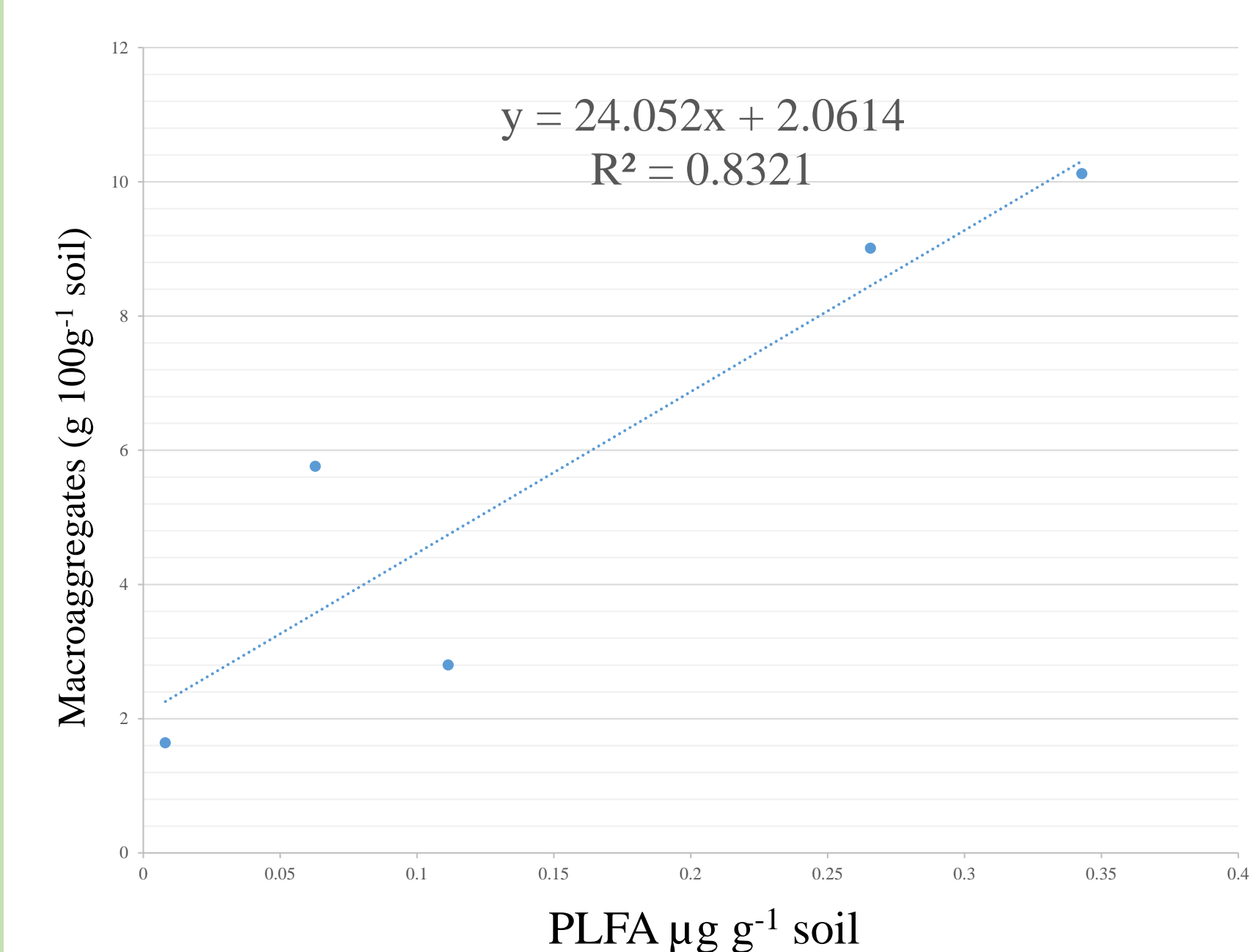


Fig. 5. Relationship between macroaggregates weights and AMF biomarker PLFA (16:1w5) in Bighorn Basin fields.

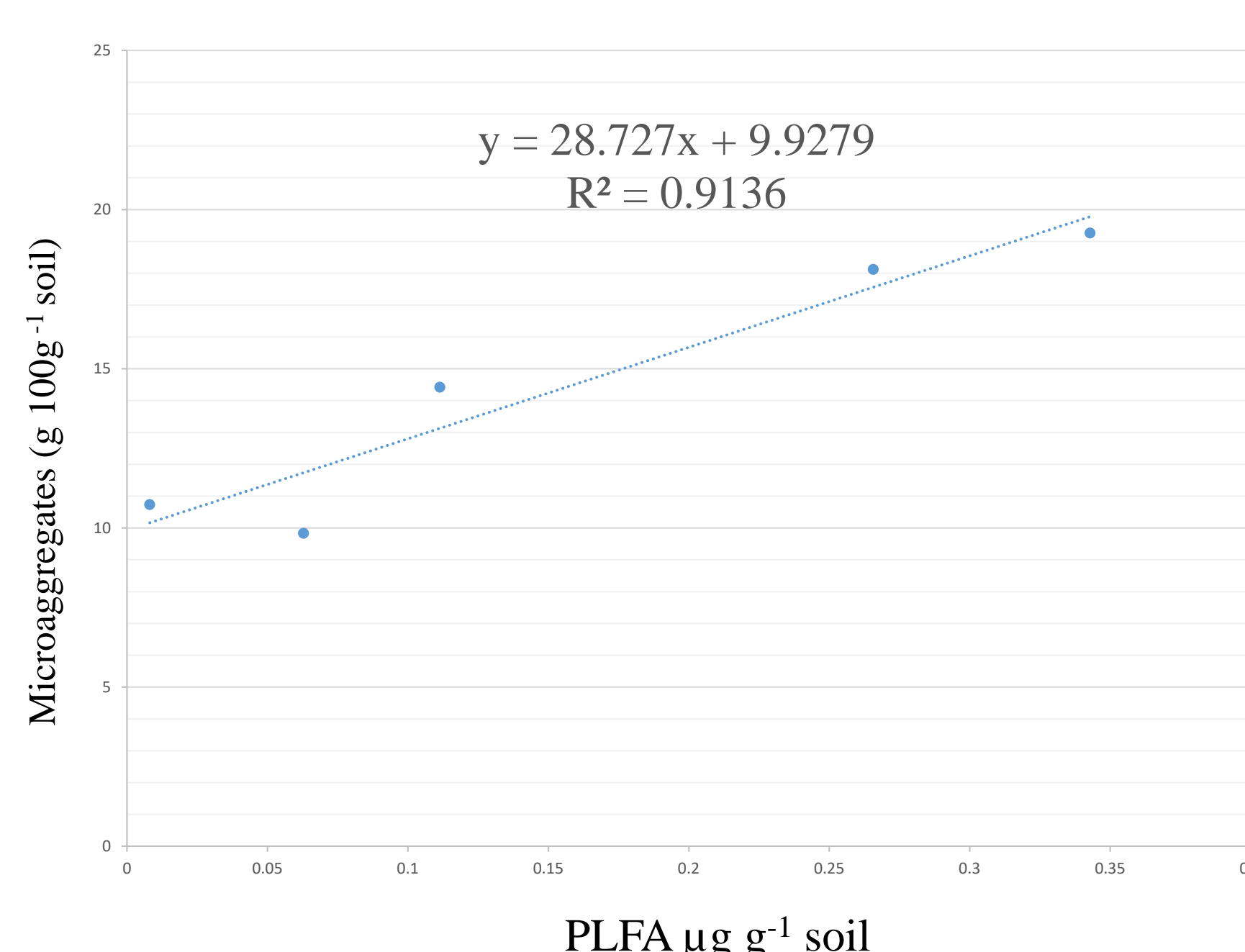


Fig. 6. Relationship between microaggregates weights and AMF biomarker PLFA (16:1w5) in Bighorn Basin fields.

❖Total carbon (TC) was measure by combustion of dry soil in a NC 1100 soil analyzer (NC 2100, Carlo Erba Instruments, Milan, Italy). Organic C will calculate as total C minus inorganic C derived from CaCO<sub>3</sub> content (Sherrod et al., 2002).

❖Arbuscular fungal biomass in soil was estimated using phospholipid fatty acid (PLFA) biomarker techniques Bligh Dyer (1959), PLFA extraction by Frostegard et al., 1991, Buyer et al., 2002 and Buyer and Sasser 2012.

## RESULTS

❖When compared to the fields without cover crops, barley as winter cover crop has a positive affect on mycorrhizal fungal biomass.

❖The result indicated mycorrhizal fungal biomass was significantly affected positively by cover crop treatments.

❖Soil in cover crops fields had higher soil aggregates stability compared to non- cover crop fields.

❖The total carbon and organic carbon were both higher in cover crops fields compared to other fields without cover crops.

❖Also, results indicated there were strong relationships between AMF biomarker, PLFA content of soil and macro-aggregates and micro-aggregates weights.

## REFERENCES

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❖Six, J., Elliott, E.T., Paustian, K., & Doran, J.W., 1998. Aggregation and soil organic matter accumulation in cultivated and native grassland soils. Soil Science Society of America Journal. 62: 1367-1376.