Ministry of Agriculture, Livestock and Irrigation

Department of Agriculture

Potential of Sunnhemp and Tithonia Green Manures for Wheat Yield and Soil Quality Improvement

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Contents

Introduction

❖ **Wheat** - one of the most important cereal crops of the world after rice

(Tiwari & Shoran, 2008)

In Mandalay region,

- total sown area – 4868 acres

- 3185 ac (65.43%) in Pyin Oo Lwin township (Pyin Oo Lwin DOA,2022)

❖ **Green Manure** - replenish the soil (add nitrogen and organic carbon to the soil)

- offers an inexpensive way of improving crop yields

(HDRA - the organic organization, 1998)

Problem Statements

- Farmers use chemical fertilizer to improve their crop productivity .
- At present, the price of fertilizer is high and accessibility is not easy due to high cost of transportation charges and mobility barriers.
- Use of animal manure and organic fertilizer is increasing
- Green manure is the good source of plant nutrient for crop yield and soil fertility improvement.
- However, farmers' knowledge on use of green manure in Pyin Oo Lwin Township is still low.

Objectives

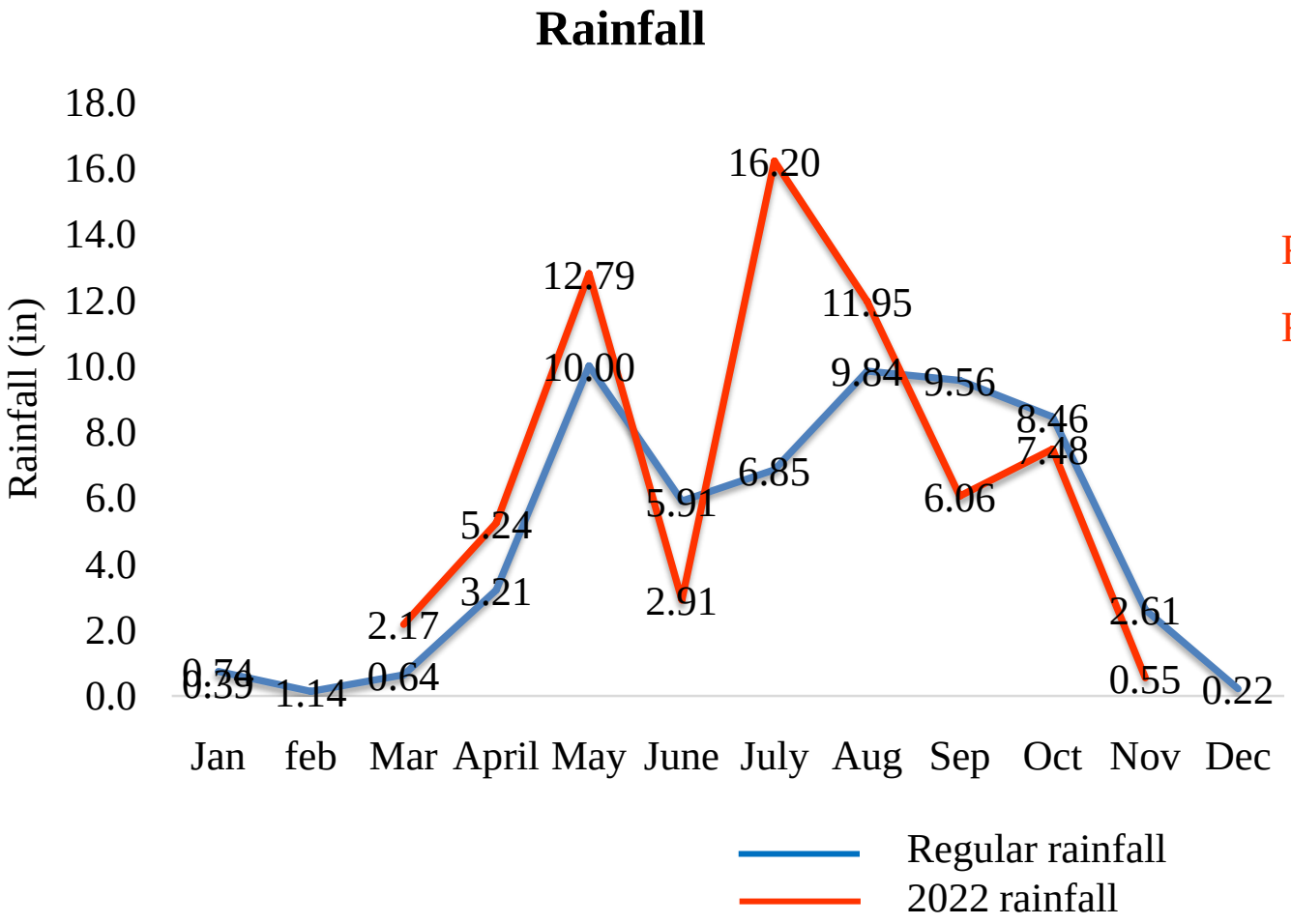
1) To analyze the effect of tithonia and sunnhemp and chicken manures (with and without urea) on wheat yield
2) To study the changes of soil properties and fertility improvement after treatments
3) To extend the knowledge of use of green manures for crop productivity and soil improvement in replace of chemical fertilizer

Materials and Method

- Experimental Site - Myaing Gyi village, Pyin Oo Lwin
- Duration - November, 2022 to April, 2023
- Experimental Design - RCB design with 3 replications
- Each plot Size - 5 m x 4 m
- Experimental Area - 48 m x 35 m (0.34 ac)
- Variety - Yezin – 9
- Seeding rate - 1.5 bsk/ac
- Spacing - 8" between rows



Monthly rainfall condition of Pyin Oo Lwin township in 2022



In 2022

Raining days – 101 days

Rainfall – 66.84 in

Regular

Raining days – 97 days

Rainfall – 58.18 in

Ref; Department of Meteorology and Hydrology, Pyin Oo Lwin,2021

Treatments

Treatments	Types	Rates
T_1	Sunnhemp only	5 tons/ac
T_2	Tithonia only	3 tons/ac
T_3	Sunnhemp + Urea	4 tons/ac+ 0.025 tons/ac
T_4	Tithonia + Urea	2 tons/ac+ 0.025 tons/ac
T_5	Chicken manure only	0.05 tons/ac
T_6 (Control) Farmer practice	Chicken manure + Urea	0.025 tons/ac+ 0.0375 tons/ac
T_7	Urea only	0.05 tons/ac

Data Collection

1. Plant height (cm)
2. Tiller no.
3. 50% flowering date
4. Length of panicle (cm)
5. Spikelets per panicle
6. Fill grains percent (%)
7. 1000 grains weight (g)
8. Yield (bsk/ac)

Research Photo

Research Photo

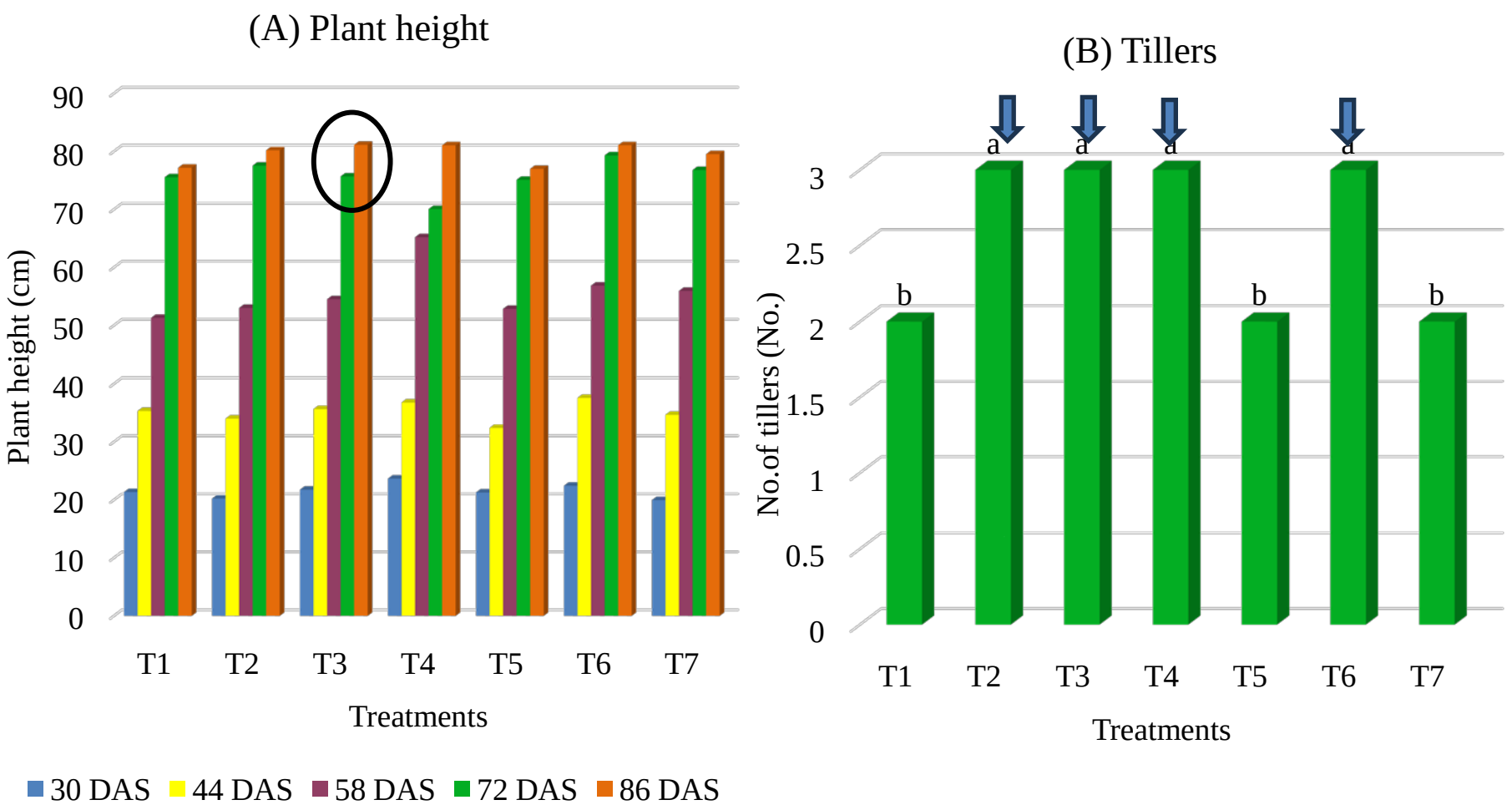
Data Analyasis

- Analyzed by using Statistix (version 8.0)
- Mean comparison – Least Significant Difference Test (LSD)

at 5% level

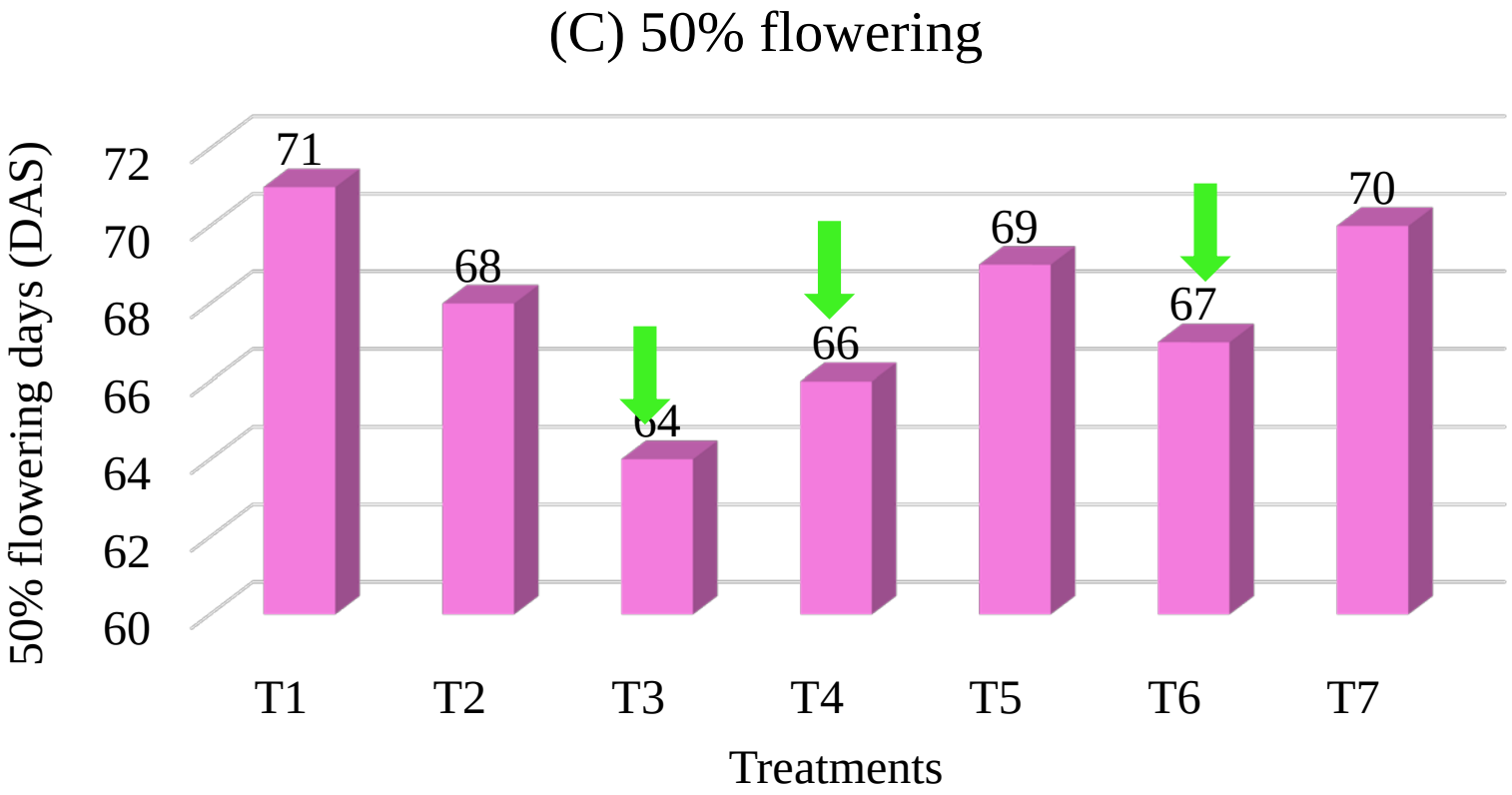
(Gomez & Gomez, 1984)

Result and Discussion



T_1 = sunnhemp, T_2 = tithonia, T_3= sunnhemp+urea, T_4 = tithonia+urea, T_5 = chicken manure, T_6 = chicken manure+urea, T_7 = urea

Fig 1. Effect of different treatments on plant height and tillers of wheat



T_1 = sunnhemp, T_2 = tithonia, T_3= sunnhemp+urea, T_4 = tithonia+urea, T_5 = chicken manure, T_6 = chicken manure+urea, T_7 = urea

Fig 2. Effect of different treatments on 50 % flowering date of wheat

Table 1. Effect of different treatments on yield and yield contributing characters of wheat

Treatments	Length of panicle (cm)	No.of spikelets panicle^{-1} (No.)	Fill grains (%)	1000 grains weight (g)	Yield (bsk/ac)
Sunnhemp	9.78 a	16.67 cd	75.33 cd	48.67 a	54.72 d
Tithonia	1.045 a	16.33 cd	80.33 bc	44.33 c	62.99 bc
Sunnhemp+Urea	10.22 a	16.67 cd	82.33 b	46.67 b	70.65 ab
Tithonia+Urea	10.40 a	18.00 bc	89.33 a	44.33 c	73.89 a
Chicken manure	9.92 a	18.67 ab	75.00 cd	46.67 b	58.95 cd
Chicken manure+Urea	10.49 a	20.00 a	79.67 bc	43.67 c	65.79 bc
Urea	10.31 a	18.33 b	71.67 d	45.67 b	60.41 cd
CV%	4.14	4.27	4.02	1.23	6.83

Maize yields were even higher with incorporation of tithonia biomass than with commercial mineral fertilizer. (Jama et al., 2000).

Soil Analytical Data

Sample	pH		EC		Organic Carbon		Humus		Total N	
	Before	After	Before	After	Before	After	Before	After	Before	After
T1	7.34	6.81	0.5	0.13	1.83	2.03	3.15	3.49	0.11	0.29
T2	7.34	7.55	0.5	0.21	1.83	2.07	3.15	3.56	0.11	0.25
T3	7.34	7.03	0.5	0.13	1.83	2.07	3.15	3.58	0.11	0.25
T4	7.34	6.97	0.5	0.17	1.83	2.59	3.15	4.47	0.11	0.33
T5	7.34	7.31	0.5	0.17	1.83	2.07	3.15	3.57	0.11	0.29

The results showed that application of green manure could significantly change the physical and chemical properties of the soil. (Hafifah et al., 2016)

Conclusion

- Highest yield (73.89 bsk/ac) was provided by T_4 (tithonia + urea) followed by T_3 (sunnhemp + urea) (70.65 bsk/ac).
- T_6 (chicken manure + urea) was produced 65.79 bsk/ac yield.
- In green manure only, tithonia manure was more relatively provided yield (8 bsk/ac) than sunnhemp manure.
- T_4 (tithonia + urea) improve soil fertility due to the addition of total nitrogen and organic carbon to the soil.

Recommendation

- According to the finding, combination of urea with green manures; T_4 (Tithonia + urea) and T_3 (Sunnhemp + urea) have higher filled grain percent, moderate 1000 grain weight and relatively produce the higher yields.

- Wheat yield on combination of urea and chicken manure, sunnhemp and tithonia produce 8.91 %, 16.59 % and 22.31 % than the single use of chicken manure, sunnhemp and tithonia.

- Combination of green manure and urea provided higher yield, easily decomposed, nutrients intake and reducing the cost of chemical fertilizer.

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THANK YOU