Biomass Production Chain and Growth Simulation Model for Kenaf

QLK5-CT-2002-01729

acronym: BIOKENAF

University of Thessaly (UTH)

Department of Agriculture, Crop Production & Rural Environment

field experiments

(tasks 2.2 & 2.3)

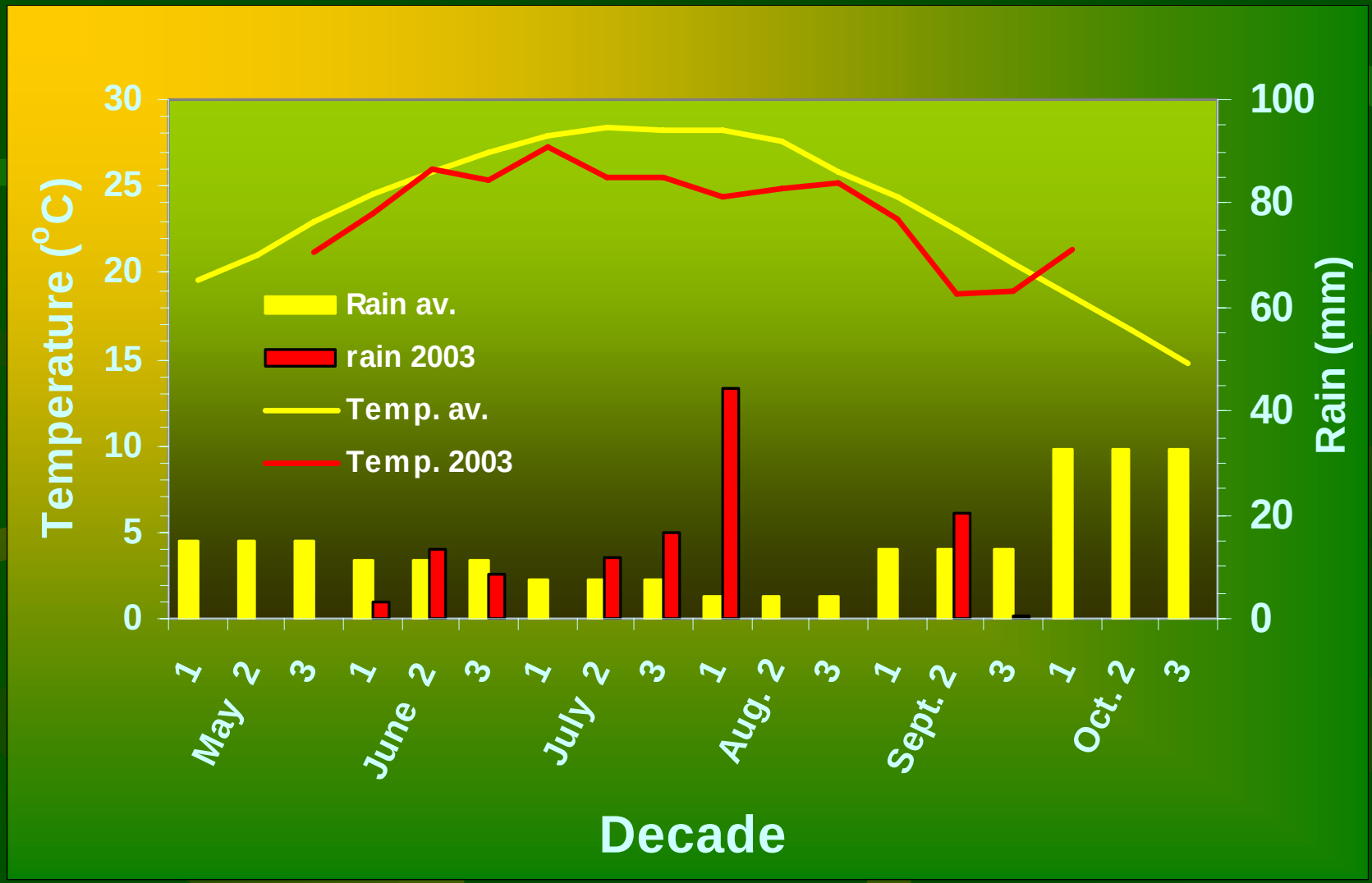

ΚΟΖΑΝΗ
Κοζάνη
ΠΙΕΡΙΑ
Κατερίνη
ΜΑΚΕΔΟΝΙΑ
Γρεβενά
ΓΡΕΒΕΝΑ
ΛΑΡΙΣΑ
ΤΡΙΚΑΛΑ
Λάρισα
Τρίκαλα
ΘΕΣΣΑΛΙΑ
ΚΑΡΔΙΤΣΑ
Βόλος
Καρδίτσα
ΑΡΤΑ
ΜΑΓΝΗΣΙΑ
ΕΥΡΥΤΑΝΙΑ
ΣΤΕΡΕΑ ΕΛΛΑΔΑ
ΦΘΙΩΤΙΔΑ
Καρπενήσι
Λαμία
ΕΥΒΟΙΑ
ΑΙΤΩΛΟΑΚΑΡΝΑΝΙΑ
ΦΩΚΙΔΑ

39º25'43.4'' N

22º05'09.7'' E

107.5 m ASL

Climatic conditions



Experiment I (task 2.2)

- factorial 2 x 2 x 2 randomized block design in 3 blocks
- Plot size: 6 m x 13 m (78 m^2)

Factors:

- 2 sowing dates S_1 : 20/5/2003
  S_2 : 13/6/2003
- 2 varieties V_1: Tainung 2
  V_2: Everglades 41
- 2 densities D_1: 200,000 pl/ha
  D_2: 400,000 pl/ha

Analysis of variance table

Source	Degrees of freedom
Replication	2
Sowing date	1
Variety	1
Density	1
S * V	1
S * D	1
V * D	1
S * V * D	1
Error	14
Total	23

Experiment II (task 2.3)

- factorial 3 x 4 split-plot design in 3 blocks
- plot size: 6 m x 6 m (36 m^2)

Factors :

3 irrigations:

I_1: 25% of PET
I_2: 50% of PET
I_3: 100% of PET

4 fertilizations:

N_0: 0 N-fertilization
N_1: 50 kg N / ha
N_2: 100 kg N /ha
N_3: 150 kg N / ha

Analysis of variance table

Source	Degrees of freedom
Replication	2
Irrigation	2
Error 1	4
Fertilization	3
I * F	6
Error 2	18
Total	35

Measurements

- plant height
- base stem diameter
- specific leaf area (SLA, m^2/kg)
- leaf area index (LAI)
- fresh weight per plant organ
- dry weight per plant organ

Until today 6 harvests (5 processed)
area sampled: 2 rows x 1.5 m = 1.5 m^2

Every day

- Evaporation (class A pan)
- Leaf temperature (not every day)
- Soil moisture content (not yet)

Every hour

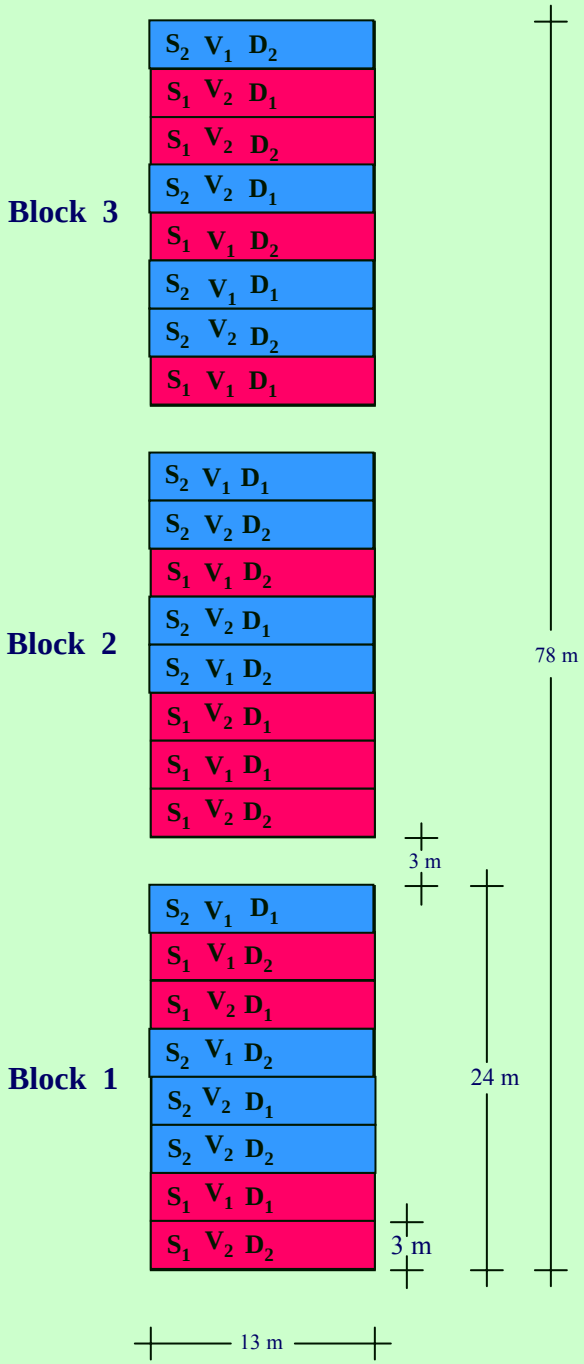
- Air temperature ^{o}C
- Radiation W/m^2
- Wind speed m/s
- Rainfall mm
- Air humidity %

2-3 times a year

- Soil analysis (July 2003)
- ➢ Plant analysis (N,P,K – not yet)
- Leaf photosynthesis 15 times (5/8-20/9)

Other measurements

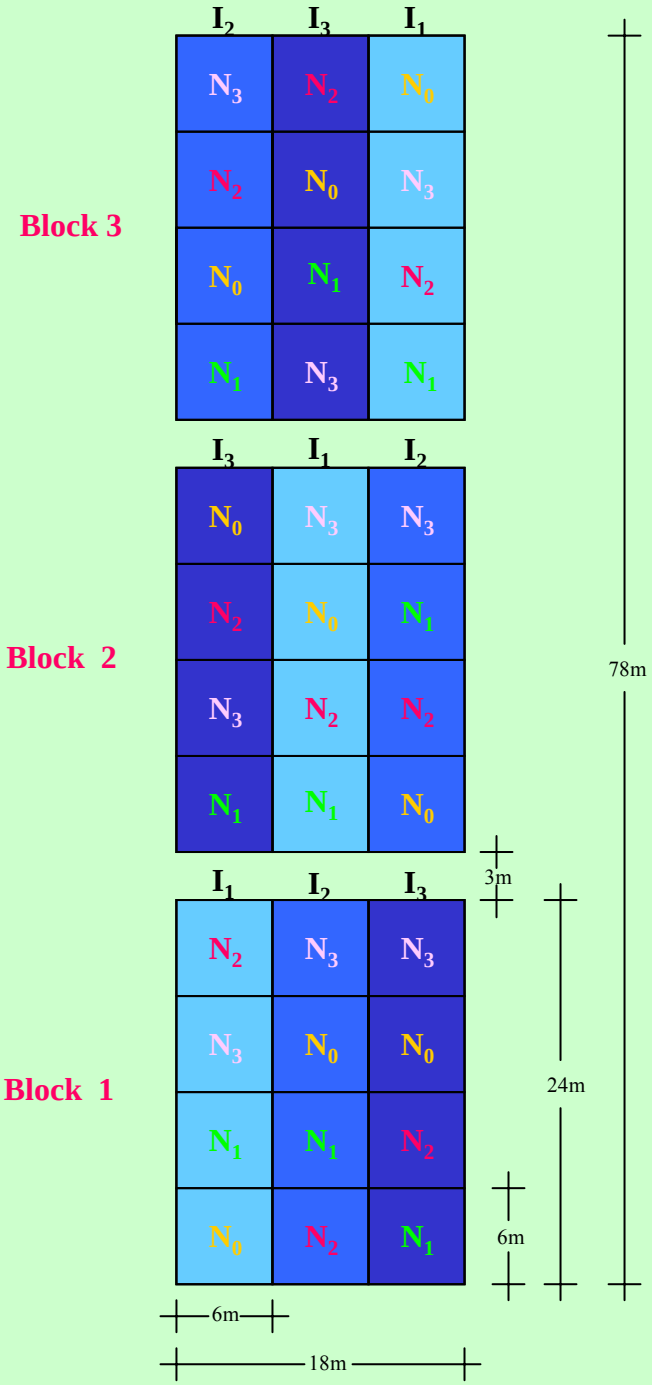
- 50% emergence (S_1:24/5, S_2: 17/6)
- flowering initiation (S_1:23/9, S_2 ……
- 50% flowering (S_1 : mm, S_2 : mm)
- 50% maturation (not yet)



FACTORS

S	V	D
Sowing time	**Variety**	**Density**
S_1=20-5-2003	V_1= Tainung 2	D_1=200000pl/ha
S_2=13-6-2003	V_2= Everlades	D_2=400000pl/ha

6 rows per plot
0,50 m between the rows
0,05 within the rows



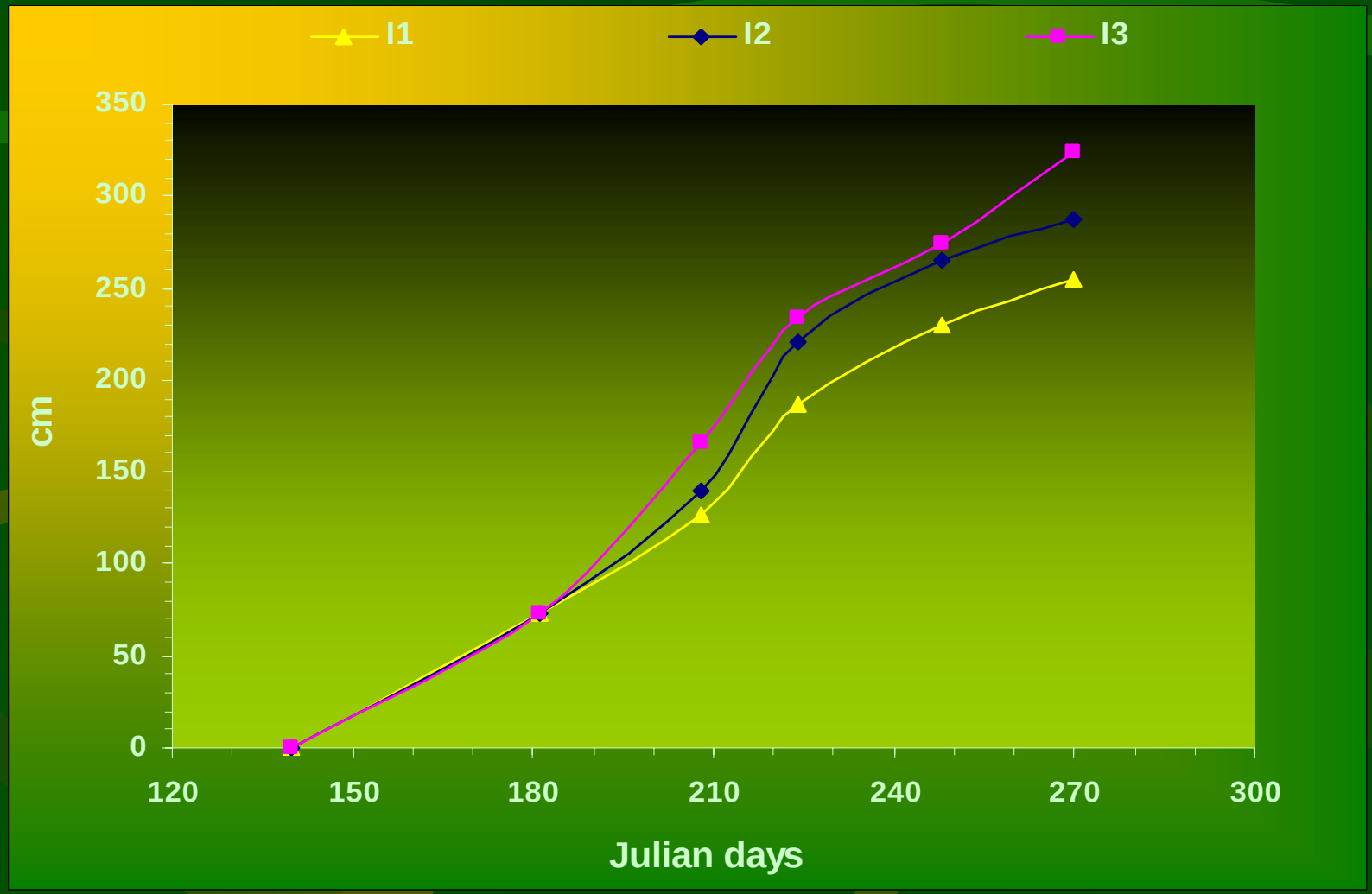
FACTORS

I IRRIGATION	N FERTILISATION
I_1=25% of PET	N_0=control
I_2=50% of PET	N_1=50 Kg/ha
I_3=100% of PET	N_2=100Kg/ha
	N_3=150Kg/ha

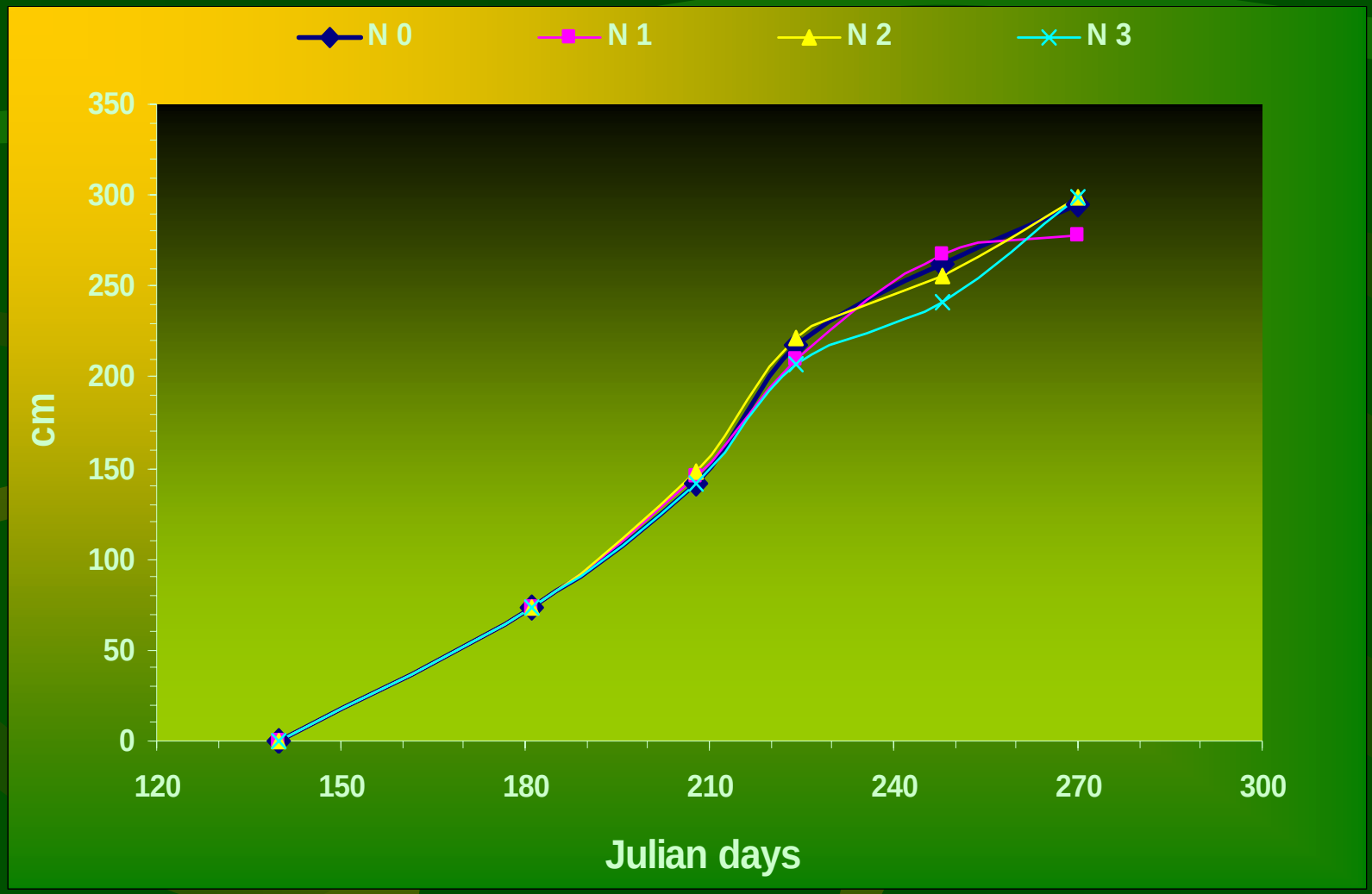
RESULTS

- Plant height
- SLA
- LAI
- Total dry biomass
- Stem biomass (dry)

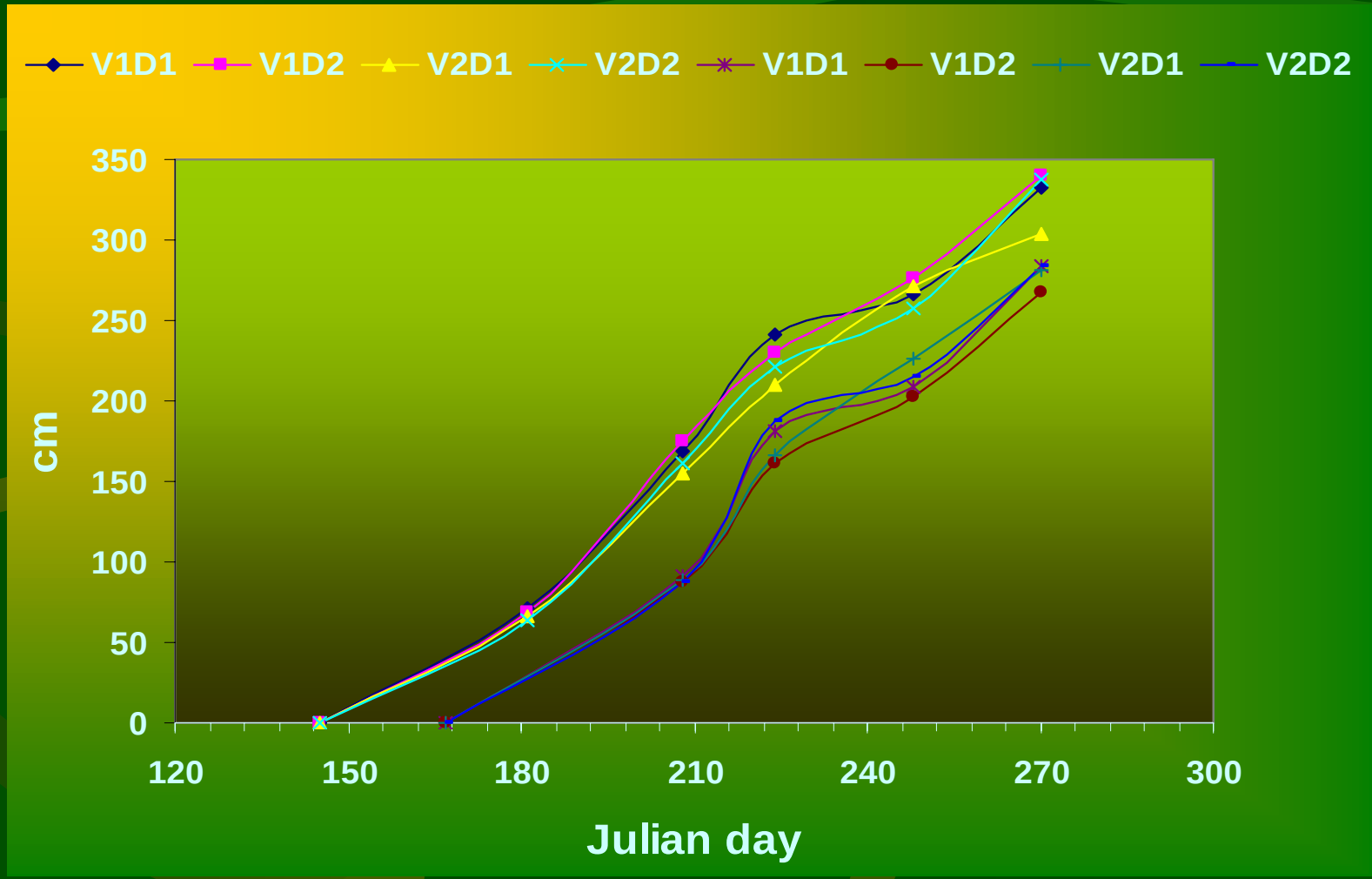
Plant height (task 2.3)



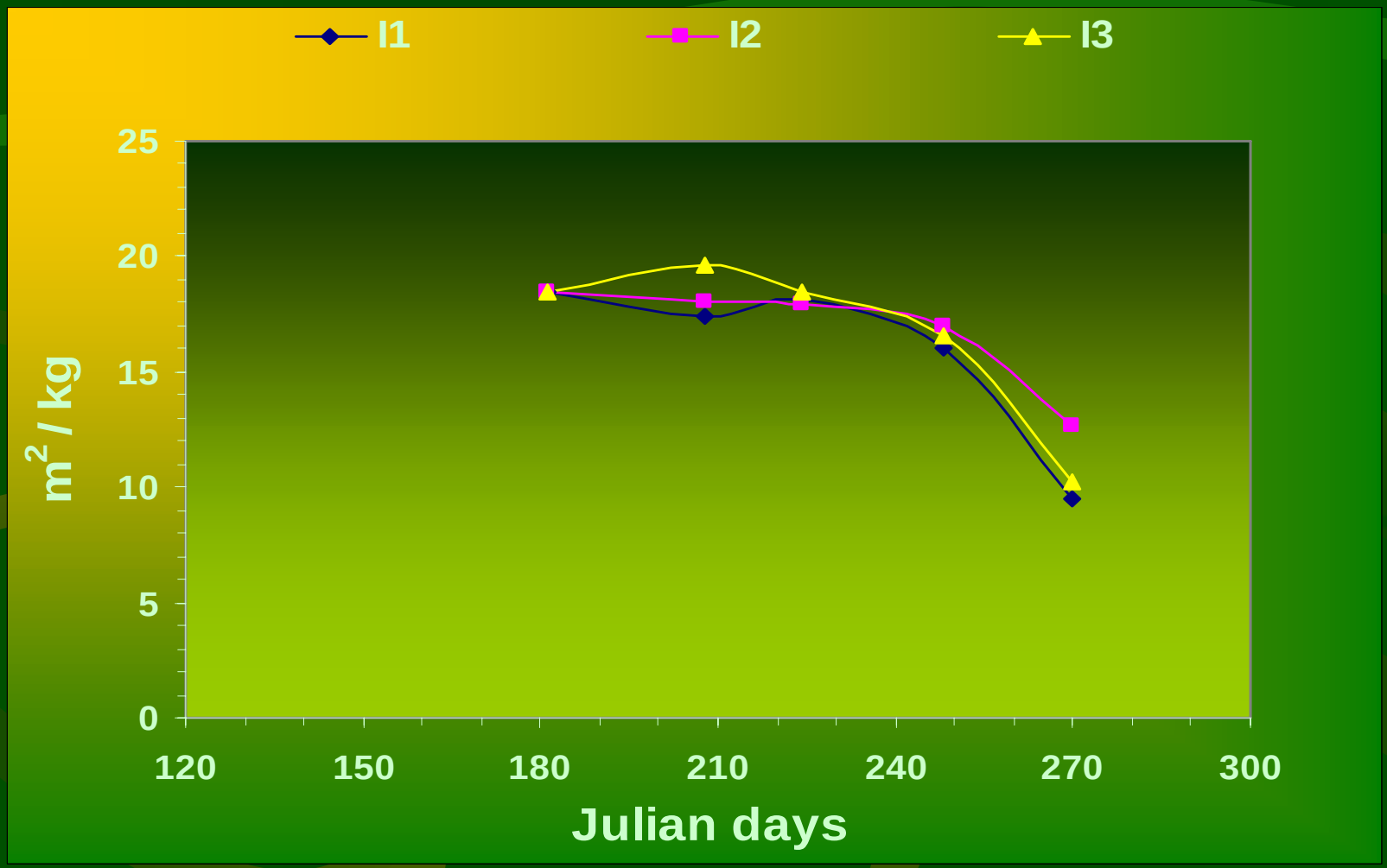
Plant height (task 2.3)



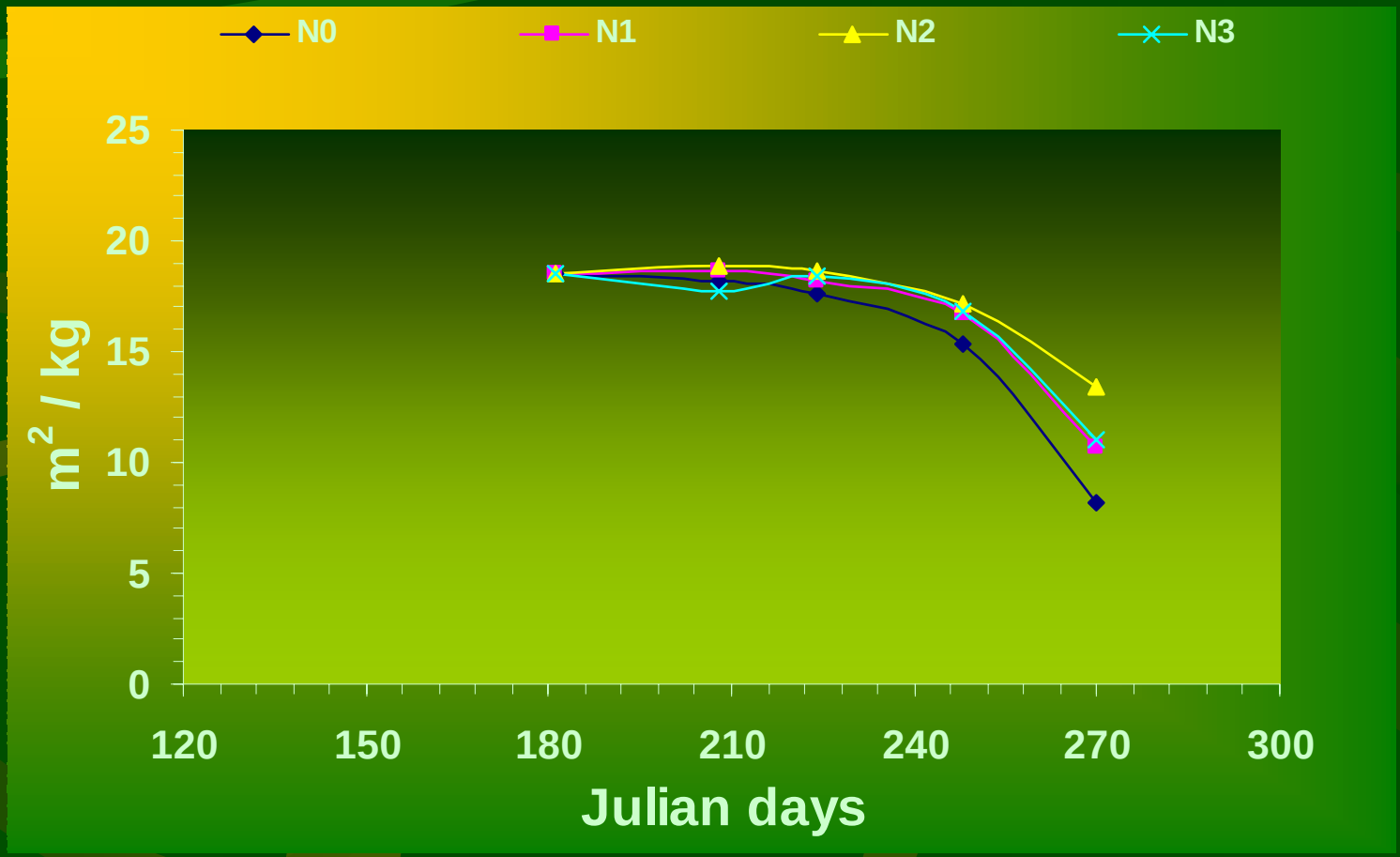
Plant height (task 2.2)



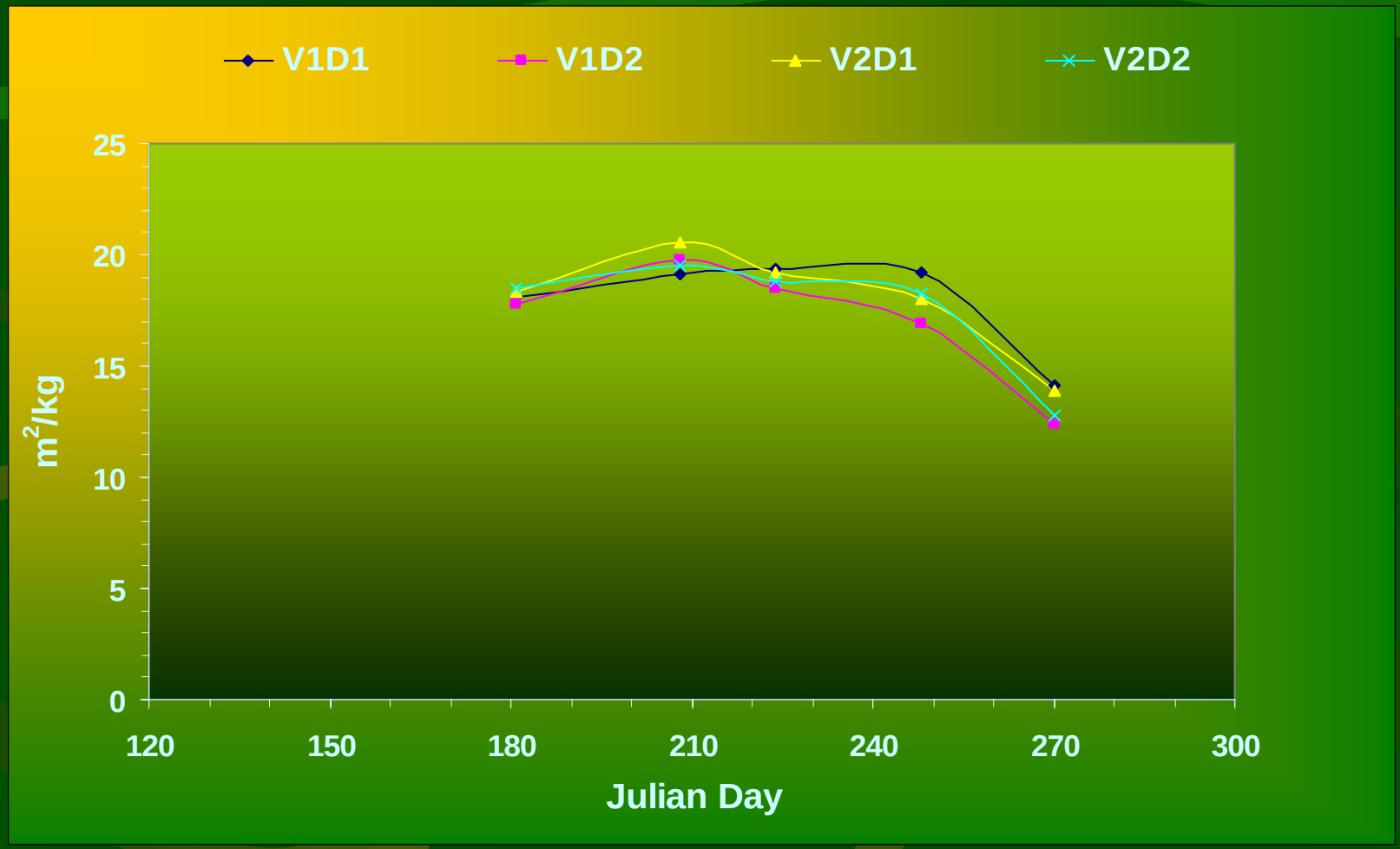
Specific Leaf Area (task 2.3)



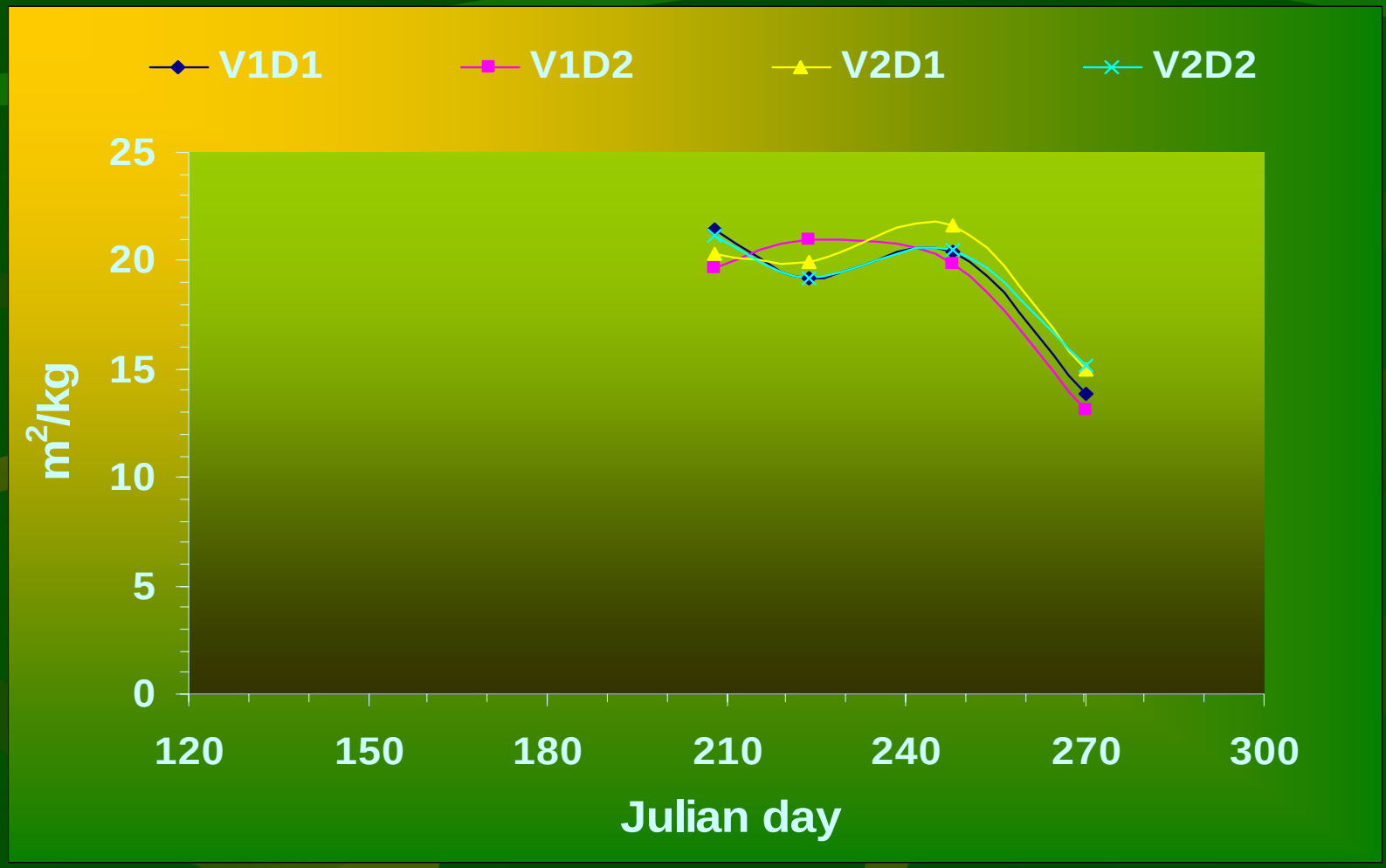
Specific Leaf Area (task 2.3)



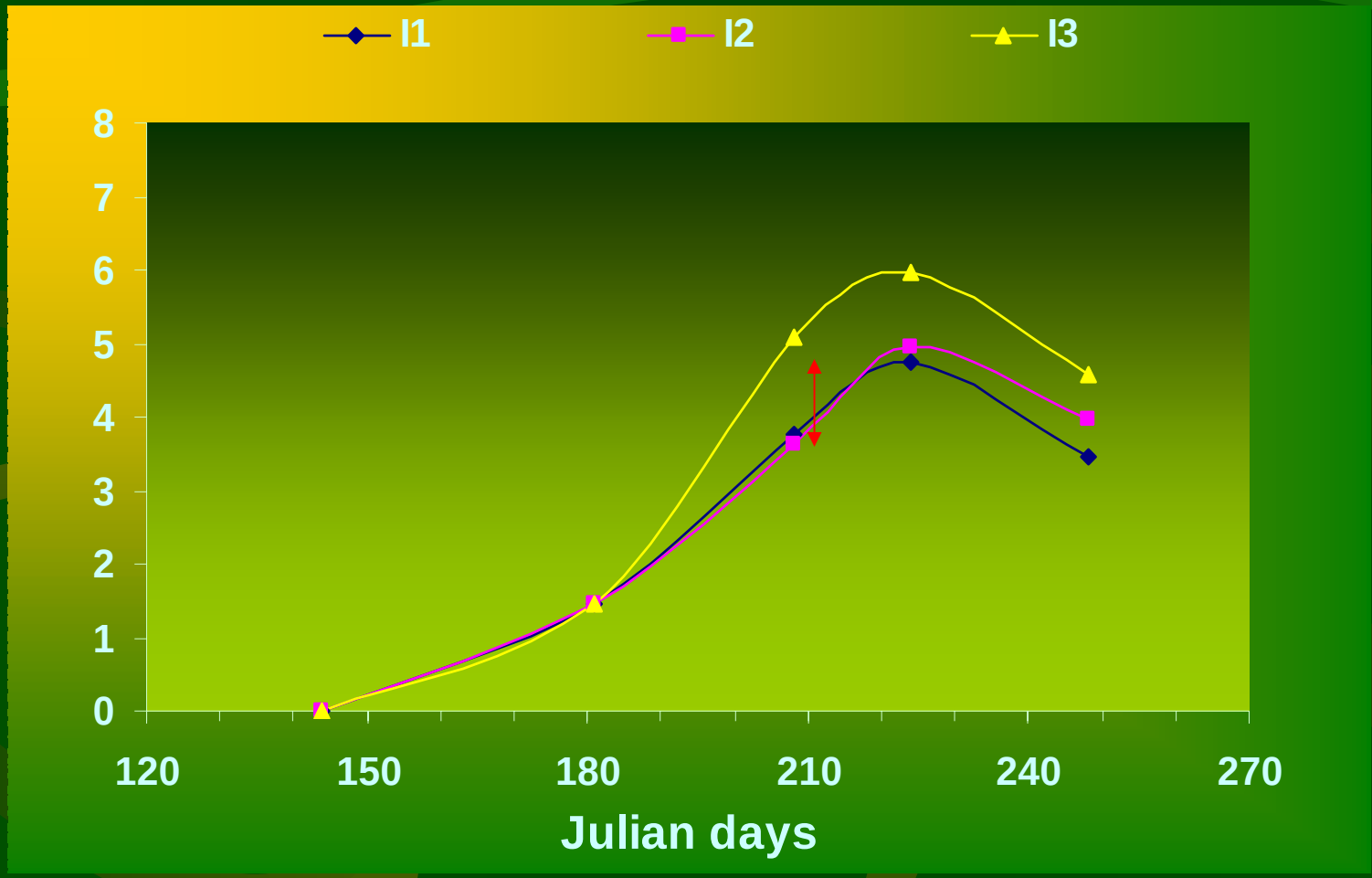
Specific Leaf Area - S1 (task 2.2)



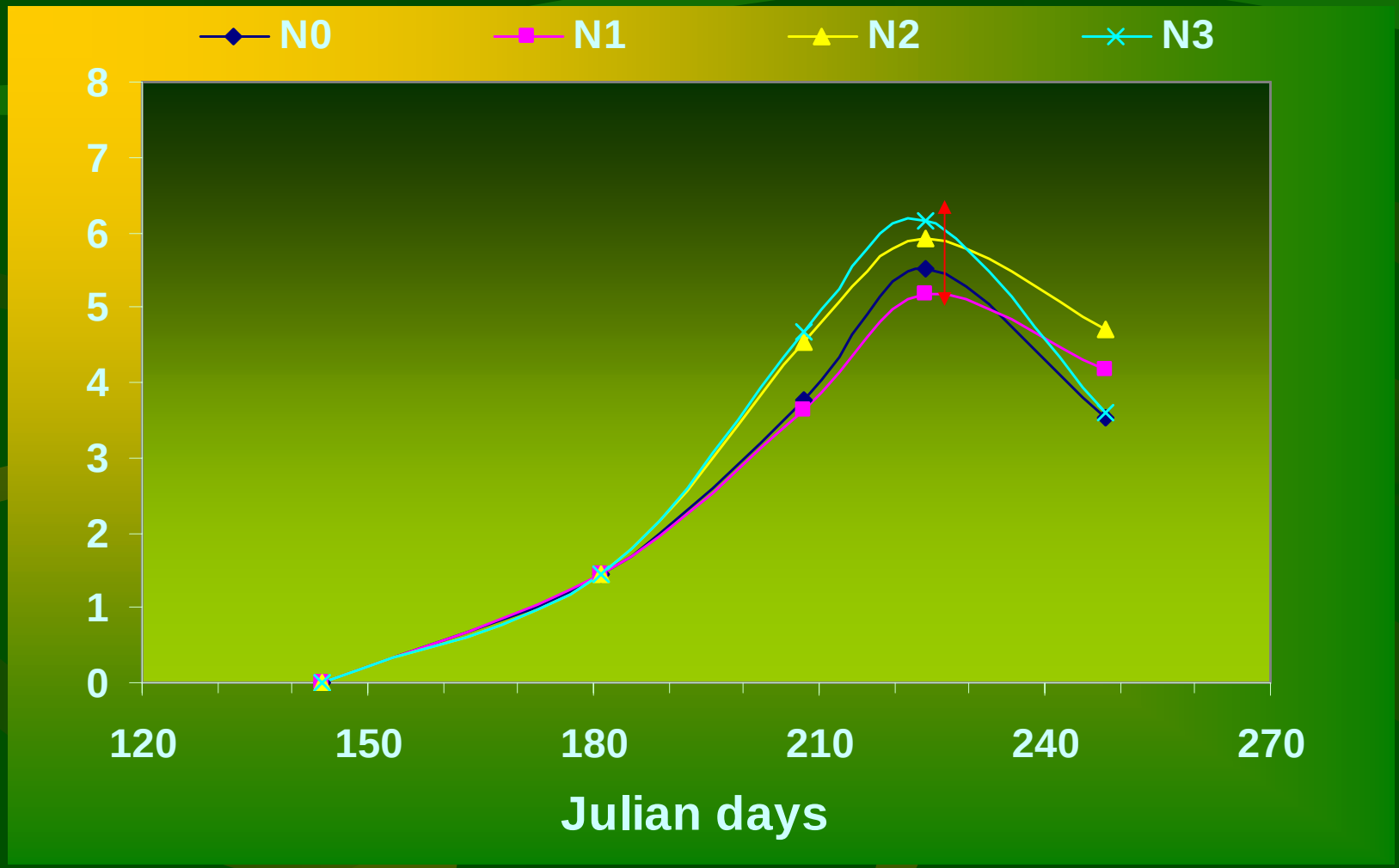
Specific Leaf Area – S2 (task 2.2)



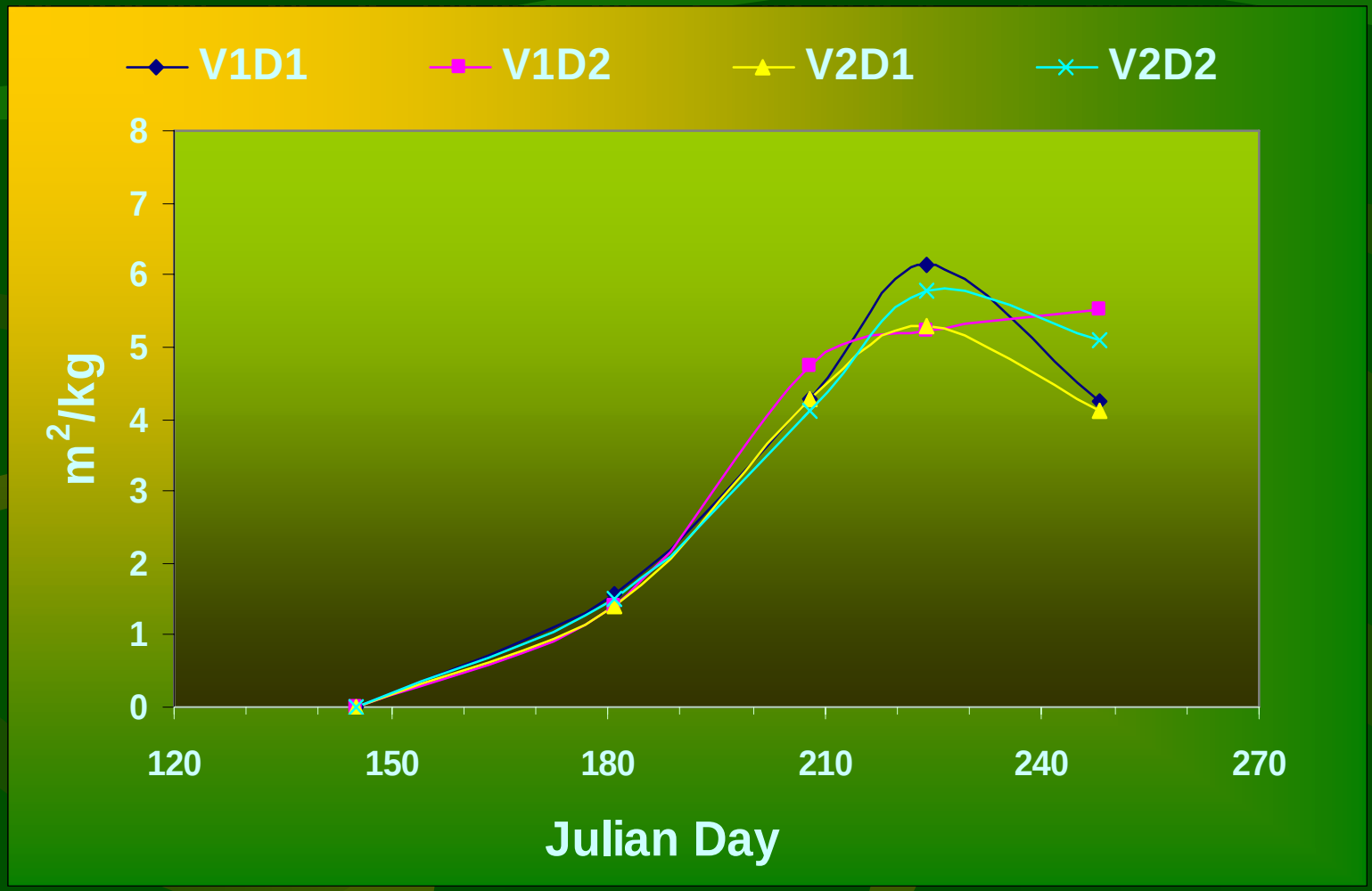
Leaf area index (task 2.3)



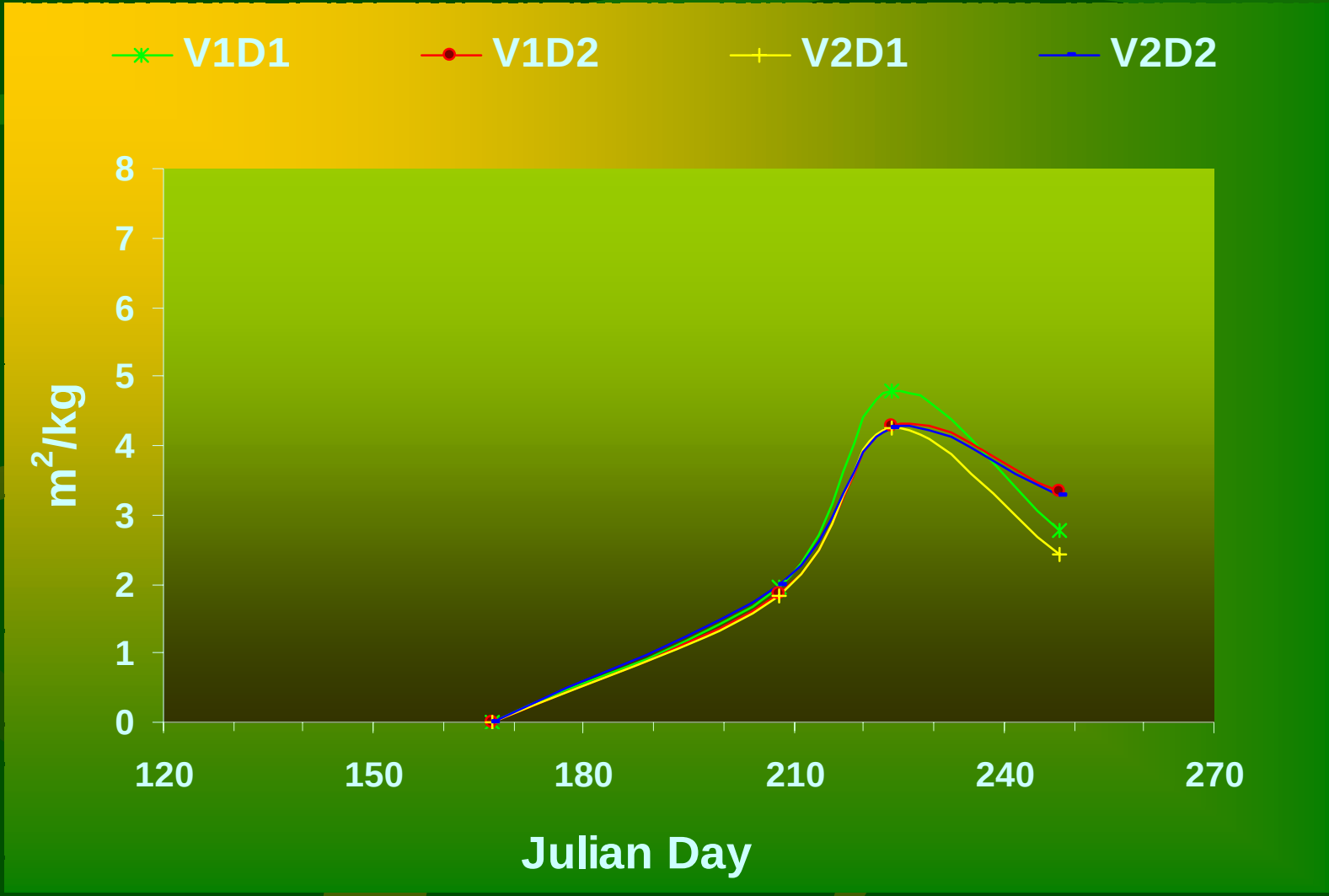
Leaf Area Index (task 2.3)



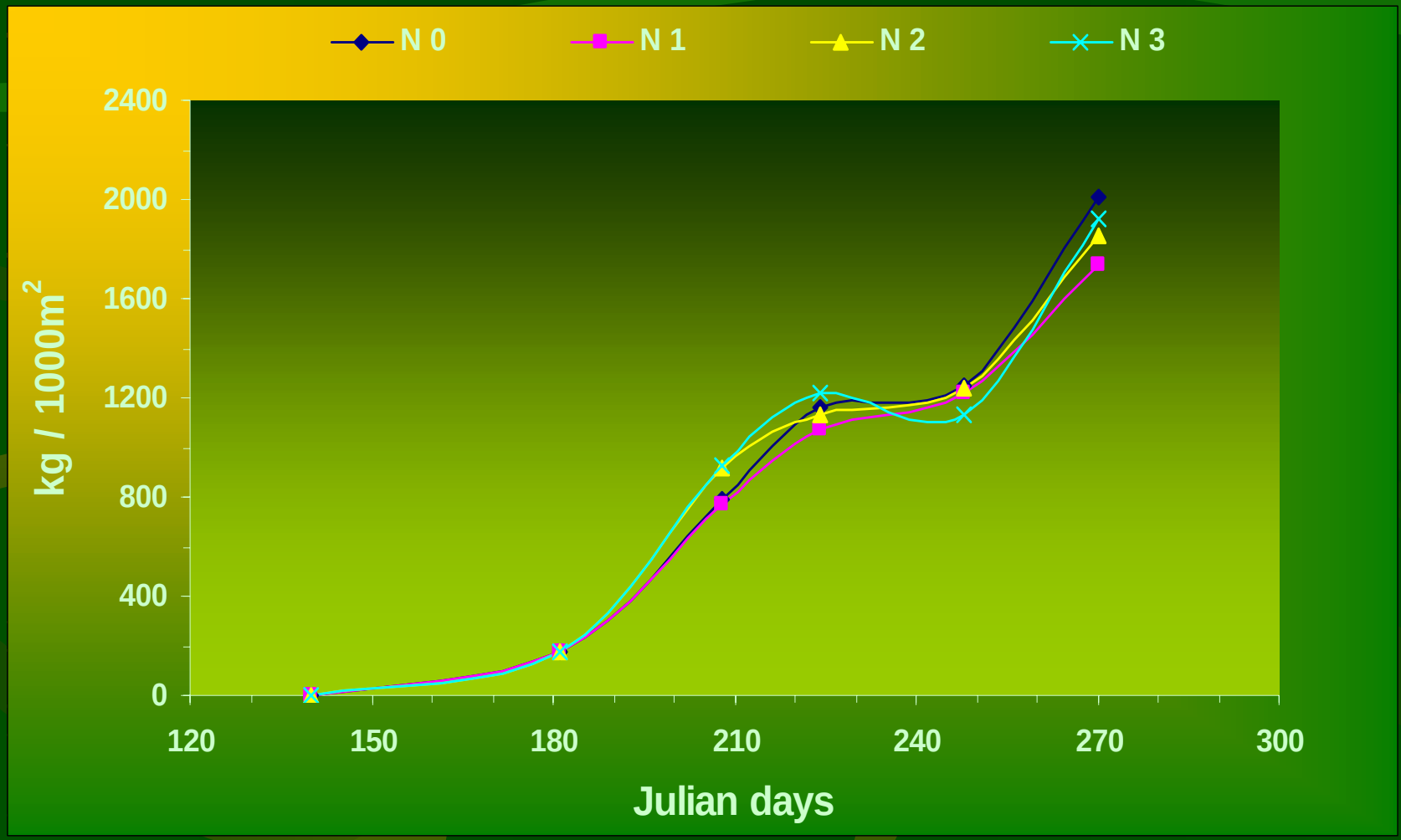
Leaf Area Index – S1 (task 2.2)



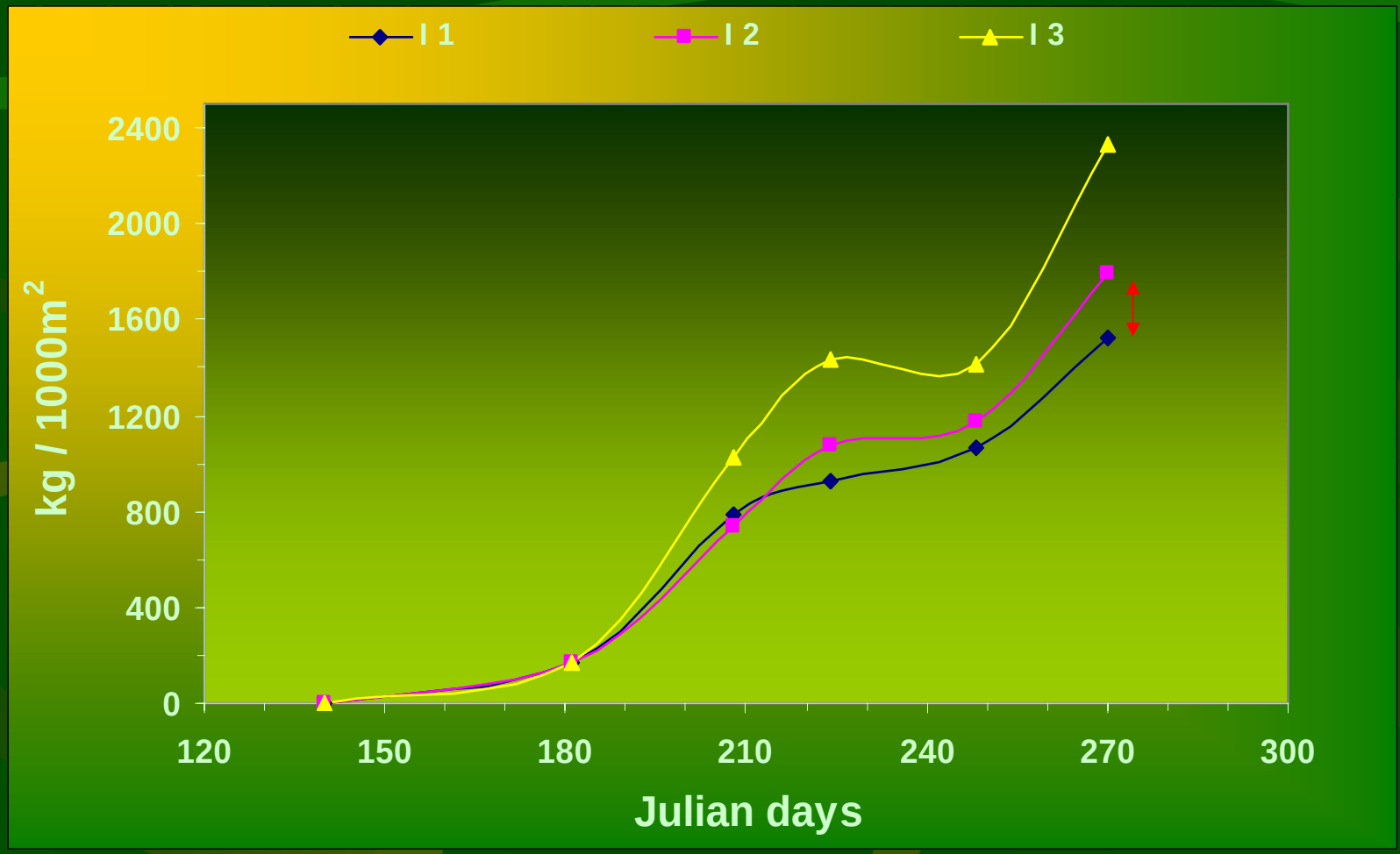
Leaf Area Index – S2 (task 2.2)



Total dry biomass (task 2.3)



Total dry biomass (task 2.3)



Stem dry biomass (task 2.3)

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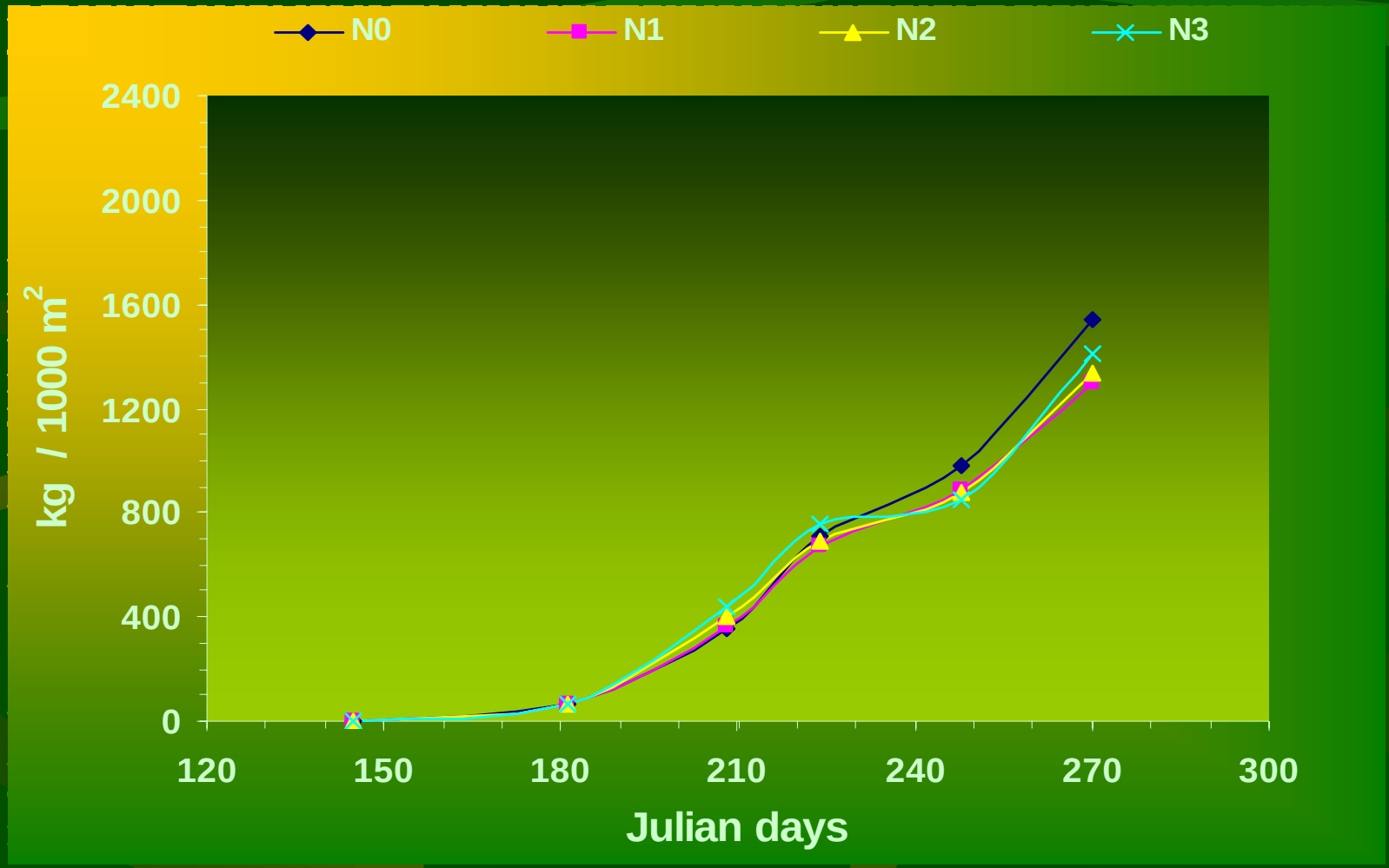
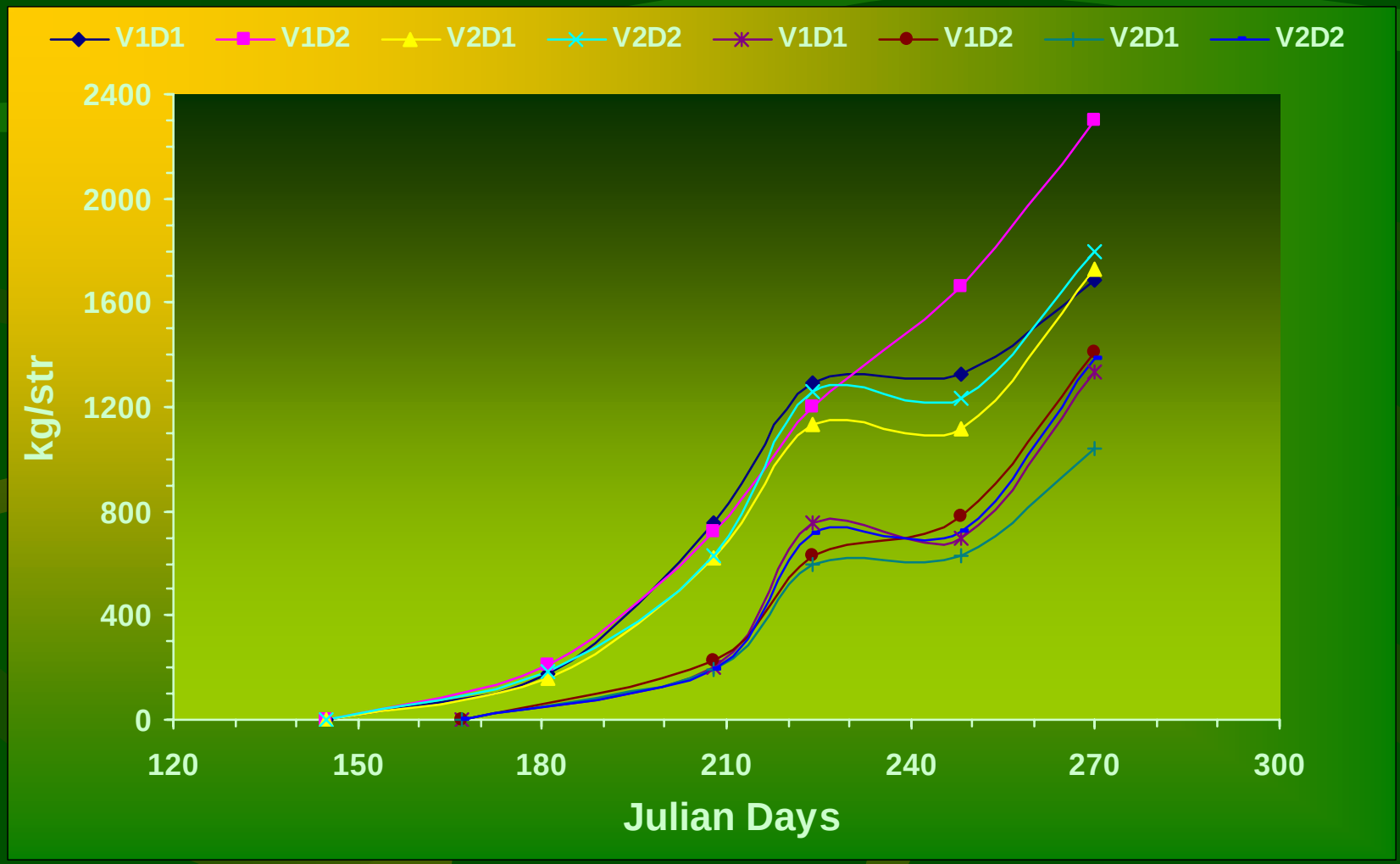


Total dry biomass (task 2.2)



Stem dry weight (task 2,2)