

Answer Sheet

LABORATORY 10: PLANT PRODUCTIVITY AND STANDING BIOMASS

Student Name _____

Student Number _____

QUESTION 1

After examining the data in **Table 10.1** and **Figure 10.1**, answer the following questions.

1.1) Relative to the total continental Global Net Primary Production what percentage comes from plant growth in the Tropical and Subtropical Moist Broadleaf Forests (T) biome?

- A 1.5%
- B 5.1%
- C 9.1%
- D 35.5%

1.2) Relative to the total continental Global Net Primary Production what percentage comes from plant growth in the Deserts and Xeric Shrublands (d) biome?

- A 1.5%
- B 5.1%
- C 9.1%
- D 35.5%

1.3) Relative to the total continental Global Net Primary Production what percentage comes from plant growth in the Boreal Forests (B) biome?

- A 1.5%
- B 5.1%
- C 9.1%
- D 35.5%

1.4) Relative to the total continental Global Net Primary Production what percentage comes from plant growth in the Temperate Grassland, Savannas & Shrublands (G)?

- A** 1.5%
- B** 5.1%
- C** 9.1%
- D** 35.5%

1.5) Explain why global terrestrial net primary productivity is so low in Northern Africa? What biome is found here?

1.6) Explain why global terrestrial net primary productivity is so high in Central Africa? What biome is found here?

After examining the data in **Table 10.1** and **Figure 10.2**, answer the following question.

1.7) In general, describe the areas in our planet's oceans where marine global net primary productivity is the highest? Why are these areas so productive?

QUESTION 2

Standing biomass refers to the amount of biomass occupying an area at a particular time. This measurement often only includes the (plant) biomass found above-ground. In the Microsoft Excel file "Lab 10 RAW Data.xlsx" are 80 measurements of standing biomass from a variety of land-based locations. These samples are from the eleven different terrestrial biomes previously described previously. Answer the questions that follow:

2.1) Using the data found in the Microsoft Excel file "Lab 10 RAW Data.xlsx" calculate the average standing biomass for the Tundra (tu) biome _____ Tons/Hectare.

2.2) Using the data found in the Microsoft Excel file "Lab 10 RAW Data.xlsx" calculate the average standing biomass for the Boreal Forests (B) biome _____ Tons/Hectare.

2.3) Using the data found in the Microsoft Excel file "Lab 10 RAW Data.xlsx" calculate the average standing biomass for the Temperate Coniferous Forests (E) biome _____ Tons/Hectare.

2.4) Using the data found in the Microsoft Excel file “Lab 10 RAW Data.xlsx” calculate the average standing biomass for the Temperate Broadleaf & Mixed Forests (De) biome _____ Tons/Hectare.

2.5) Using the data found in the Microsoft Excel file “Lab 10 RAW Data.xlsx” calculate the average standing biomass for the Temperate Grassland, Savannas & Shrublands (G) biome _____ Tons/Hectare.

2.6) Using the data found in the Microsoft Excel file “Lab 10 RAW Data.xlsx” calculate the average standing biomass for the Desert and Xeric Shrublands (d) biome _____ Tons/Hectare.

2.7) Using the data found in the Microsoft Excel file “Lab 10 RAW Data.xlsx” calculate the average standing biomass for the Tropical & Subtropical Grasslands, Savannas & Shrublands (S) biome _____ Tons/Hectare.

2.8) Using the data found in the Microsoft Excel file “Lab 10 RAW Data.xlsx” calculate the average standing biomass for the Tropical & Subtropical Dry Broadleaf Forests (Td) biome _____ Tons/Hectare.

2.9) Using the data found in the Microsoft Excel file “Lab 10 RAW Data.xlsx” calculate the average standing biomass for the Tropical & Subtropical Moist Broadleaf Forests (T) biome _____ Tons/Hectare.

2.10) Which biome has the greatest standing biomass per unit area?

- A Tropical & Subtropical Moist Broadleaf Forests (T)
- B Tropical & Subtropical Dry Broadleaf Forests (Td)
- C Temperate Broadleaf & Mixed Forests (De)
- D Temperate Coniferous Forests (E)

2.11) Which biome has the lowest standing biomass per unit area?

- A Boreal Forests (B)
- B Temperate Grassland, Savannas & Shrublands (G)
- C Desert & Xeric Shrublands (d)
- D Tundra (tu)

QUESTION 3

After examining the data **Figure 10.5**, answer the following questions.

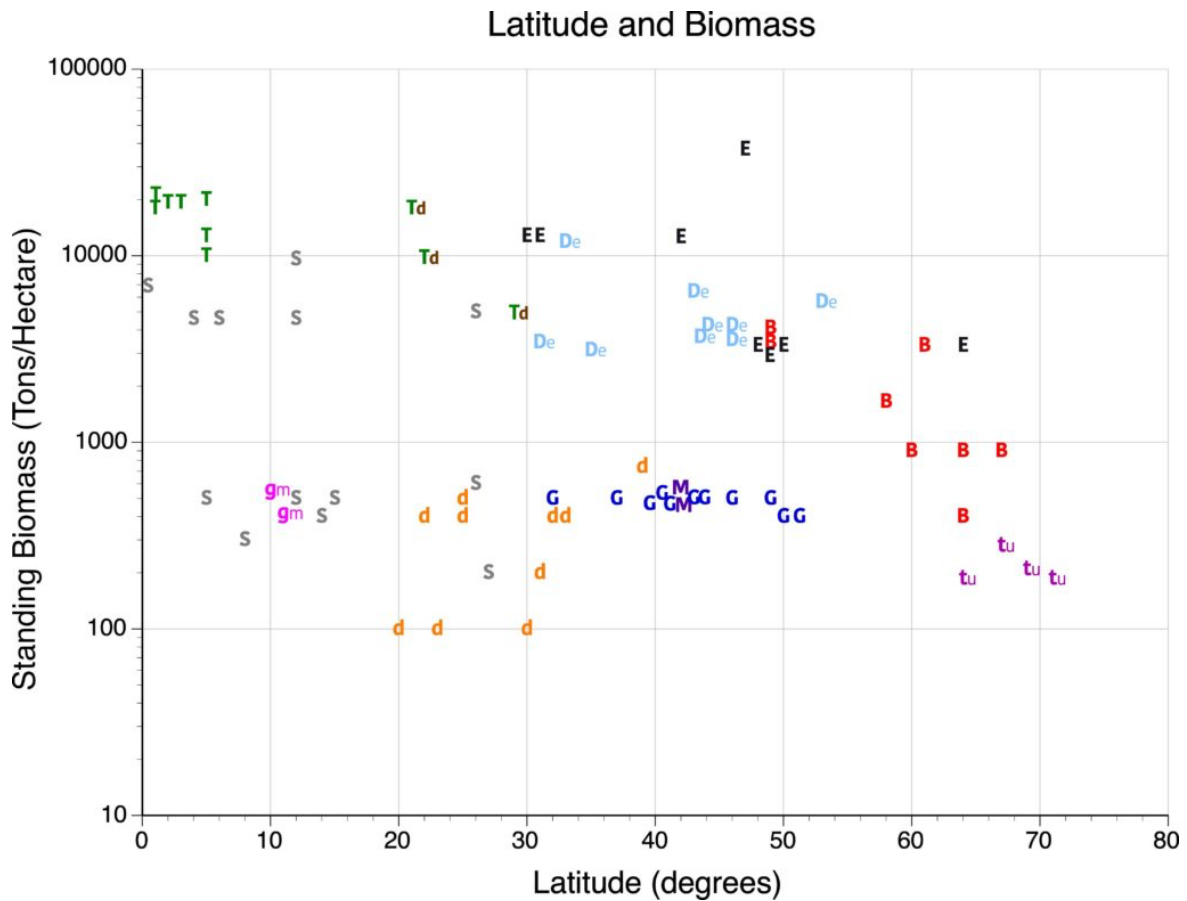


Figure 10.5. Relationship between measured standing biomass and latitude for 80 sampled locations. Eleven types of biomes are shown: T = Tropical & Subtropical Moist Broadleaf Forests, Td = Tropical & Subtropical Dry Broadleaf Forests, S = Tropical & Subtropical Grasslands, Savannas & Shrublands, d = Deserts & Xeric Shrublands, gm = Montane Grasslands & Shrublands, M = Mediterranean Forests, Woodlands & Scrub, G = Temperate Grassland, Savannas & Shrublands, De = Temperate Broadleaf & Mixed Forests, E = Temperate Coniferous Forests, B = Boreal Forests, and tu = Tundra.

3.1) According to **Figure 10.5**, the Tropical & Subtropical Moist Broadleaf Forests (T) biome is found between what latitudes?

- A 0 to 6 degrees.
- B 0 to 28 degrees.
- C 20 to 30 degrees.
- D 20 to 40 degrees.

3.2) According to **Figure 10.5**, the Desert & Xeric Shrublands (d) biome is found between what latitudes?

- A 0 to 6 degrees.
- B 0 to 28 degrees.
- C 20 to 30 degrees.
- D 20 to 40 degrees.

3.3) According to **Figure 10.5**, the Tropical & Subtropical Grasslands, Savannas & Shrublands (S) biome is found between what latitudes?

- A 0 to 6 degrees.
- B 0 to 28 degrees.
- C 20 to 30 degrees.
- D 20 to 40 degrees.

3.4) According to **Figure 10.5**, the Temperate Grassland, Savannas & Shrublands (G) biome is found between what latitudes?

- A 30 to 52 degrees.
- B 48 to 68 degrees.
- C 20 to 30 degrees.
- D 20 to 40 degrees.

3.5) According to **Figure 10.5**, the Boreal Forests (B) biome is found between what latitudes?

- A 30 to 52 degrees.
- B 48 to 68 degrees.
- C 20 to 30 degrees.
- D 20 to 40 degrees.

3.6) According to **Figure 10.5**, the Tundra (tu) biome is found between what latitudes?

- A 30 to 52 degrees.
- B 48 to 68 degrees.
- C 20 to 30 degrees.
- D 62 to 72 degrees.

QUESTION 4

After examining the data **Figure 10.6**, answer the following questions.

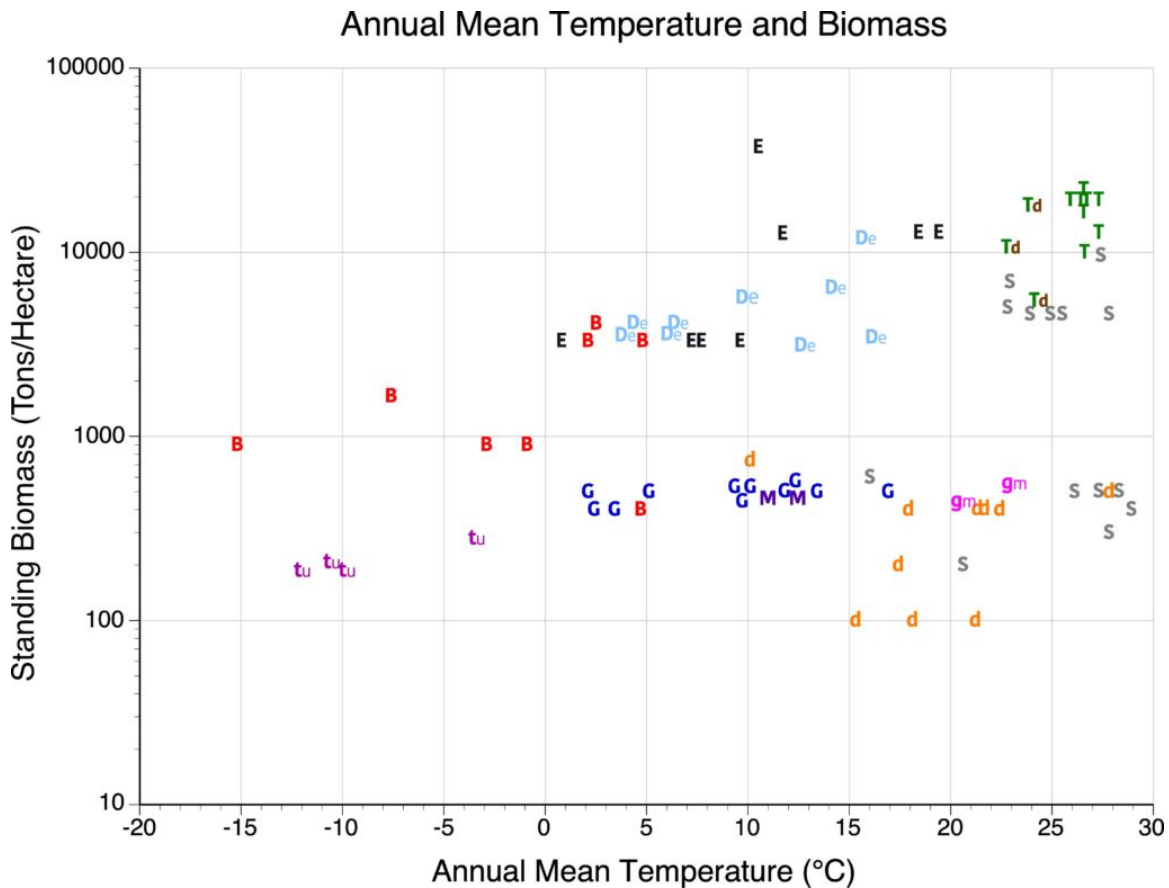


Figure 10.6. Relationship between measured standing biomass and annual mean temperature for 80 sampled locations. Eleven types of biomes are shown: T = Tropical & Subtropical Moist Broadleaf Forests, Td = Tropical & Subtropical Dry Broadleaf Forests, S = Tropical & Subtropical Grasslands, Savannas & Shrublands, d = Deserts & Xeric Shrublands, gm = Montane Grasslands & Shrublands, M = Mediterranean Forests, Woodlands & Scrub, G = Temperate Grassland, Savannas & Shrublands, De = Temperate Broadleaf & Mixed Forests, E = Temperate Coniferous Forests, B = Boreal Forests, and tu = Tundra.

4.1) According to **Figure 10.6**, the Tundra (tu) biome is found between what values of annual mean temperature?

- A -15 to 5 degrees Celsius.
- B -13 to -3 degrees Celsius.
- C 2 to 17 degrees Celsius.
- D 0 to 20 degrees Celsius.

4.2) According to **Figure 10.6**, the Boreal Forests (B) biome is found between what values of annual mean temperature?

- A -15 to 5 degrees Celsius.
- B -13 to -3 degrees Celsius.
- C 2 to 17 degrees Celsius.
- D 0 to 20 degrees Celsius.

4.3) According to **Figure 10.6**, the Temperate Coniferous Forests (E) biome is found between what values of annual mean temperature?

- A -15 to 5 degrees Celsius.
- B -13 to -3 degrees Celsius.
- C 2 to 17 degrees Celsius.
- D 0 to 20 degrees Celsius.

4.4) According to **Figure 10.6**, the Tropical & Subtropical Grasslands, Savannas & Shrublands (S) biome is found between what values of annual mean temperature?

- A 10 to 28 degrees Celsius.
- B 25 to 28 degrees Celsius.
- C 3 to 17 degrees Celsius.
- D 16 to 29 degrees Celsius.

4.5) According to **Figure 10.6**, the Tropical & Subtropical Moist Broadleaf Forests (T) biome is found between what values of annual mean temperature?

- A 10 to 28 degrees Celsius.
- B 25 to 28 degrees Celsius.
- C 3 to 17 degrees Celsius.
- D 16 to 29 degrees Celsius.

4.6) According to **Figure 10.6**, the Desert & Xeric Shrublands (d) biome is found between what values of annual mean temperature?

A 10 to 28 degrees Celsius.

B 25 to 28 degrees Celsius.

C 3 to 17 degrees Celsius.

D 16 to 29 degrees Celsius.

4.7) With the help of **Figure 10.6**, explain what happens to plant productivity (as measured by standing biomass) as annual mean temperature increases.

QUESTION 5

After examining the data **Figure 10.7**, answer the following questions.

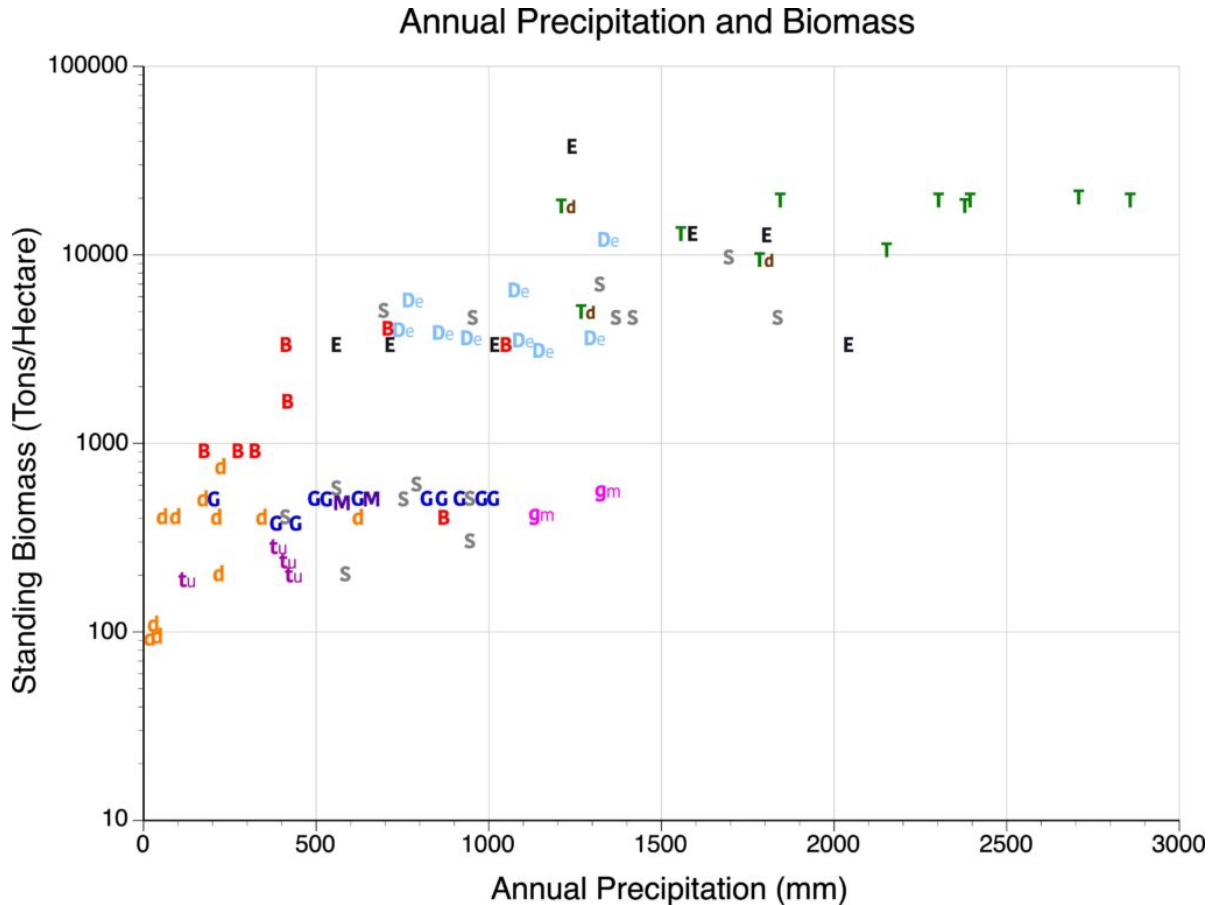


Figure 10.7. Relationship between measured standing biomass and annual precipitation for 80 sampled locations. Eleven types of biomes are shown: T = Tropical & Subtropical Moist Broadleaf Forests, Td = Tropical & Subtropical Dry Broadleaf Forests, S = Tropical & Subtropical Grasslands, Savannas & Shrublands, d = Deserts & Xeric Shrublands, gm = Montane Grasslands & Shrublands, M = Mediterranean Forests, Woodlands & Scrub, G = Temperate Grassland, Savannas & Shrublands, De = Temperate Broadleaf & Mixed Forests, E = Temperate Coniferous Forests, B = Boreal Forests, and tu = Tundra.

5.1) According to **Figure 10.7**, the Tundra (tu) biome is found between what values of annual precipitation?

- A 0 to 500 mm.
- B 0 to 700 mm.
- C 500 to 2100 mm.
- D 1500 to 3000 mm.

5.2) According to **Figure 10.7**, the Tropical & Subtropical Moist Broadleaf Forests (T) biome is found between what values of annual precipitation?

- A 0 to 500 mm.
- B 0 to 700 mm.
- C 500 to 2100 mm.
- D 1500 to 3000 mm.

5.3) According to **Figure 10.7**, the Temperate Broadleaf & Mixed Forests (De) biome is found between what values of annual precipitation?

- A 0 to 500 mm.
- B 0 to 700 mm.
- C 700 to 1300 mm.
- D 1500 to 3000 mm.

5.4) According to **Figure 10.7**, the Desert & Xeric Shrublands (d) biome is found between what values of annual precipitation?

- A 0 to 500 mm.
- B 0 to 700 mm.
- C 700 to 1300 mm.
- D 1500 to 3000 mm.

5.5) According to **Figure 10.7**, the Temperate Grassland, Savannas & Shrublands (G) biome is found between what values of annual precipitation?

- A 0 to 500 mm.
- B 200 to 1100 mm.
- C 700 to 1400 mm.
- D 400 to 1800 mm.

5.6) With the help of **Figure 10.7**, explain what happens to plant productivity (as measured by standing biomass) as annual precipitation increases.