
SOPHIA FOREST

OUTLINE

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2- FOREST BIODIVERSITY

3- CACBON VOLUME- DATA & CACULATION

4- CONCLUSION

BRIEFING OF PARTICIPANTS

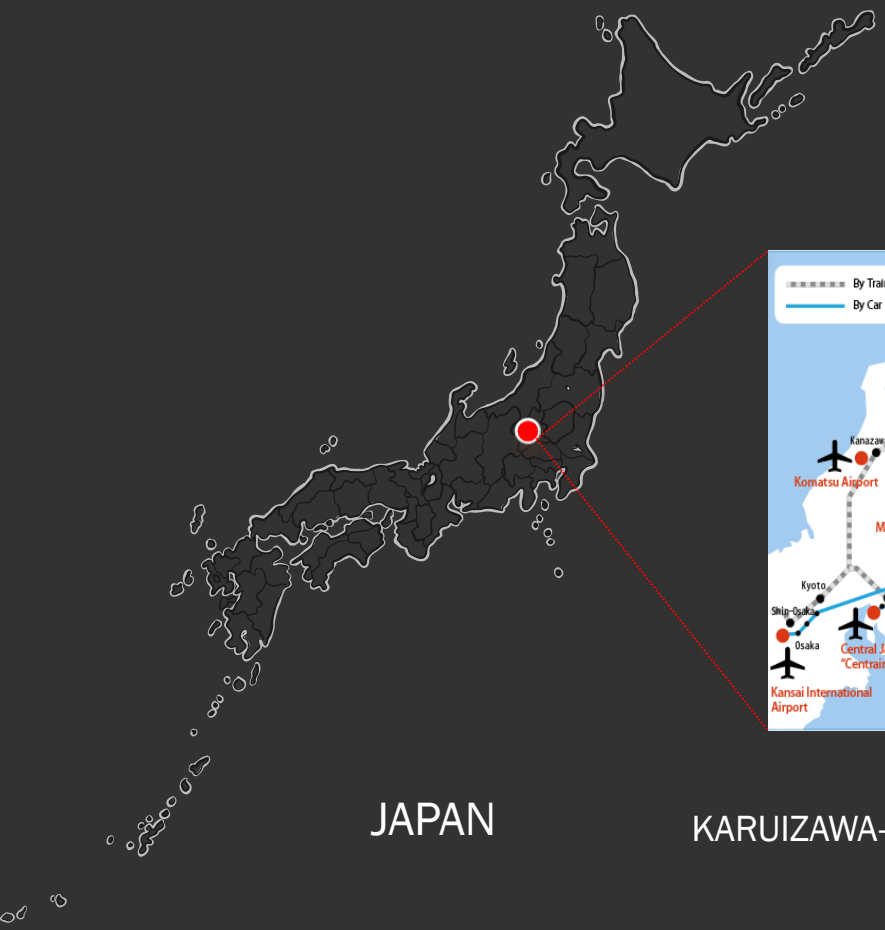
PLOTTING THE 20 METER BY 20 METER AREA

MARKING OF TREES OUTSIDE THE SURVEY PLOT

MEASUREMENT OF THE DIMENSIONS OF TREES

ESTIMATE CACBON VOLUME

INTRODUCTIONS



JAPAN

KARUIZAWA- NAGANO PREFECTURE

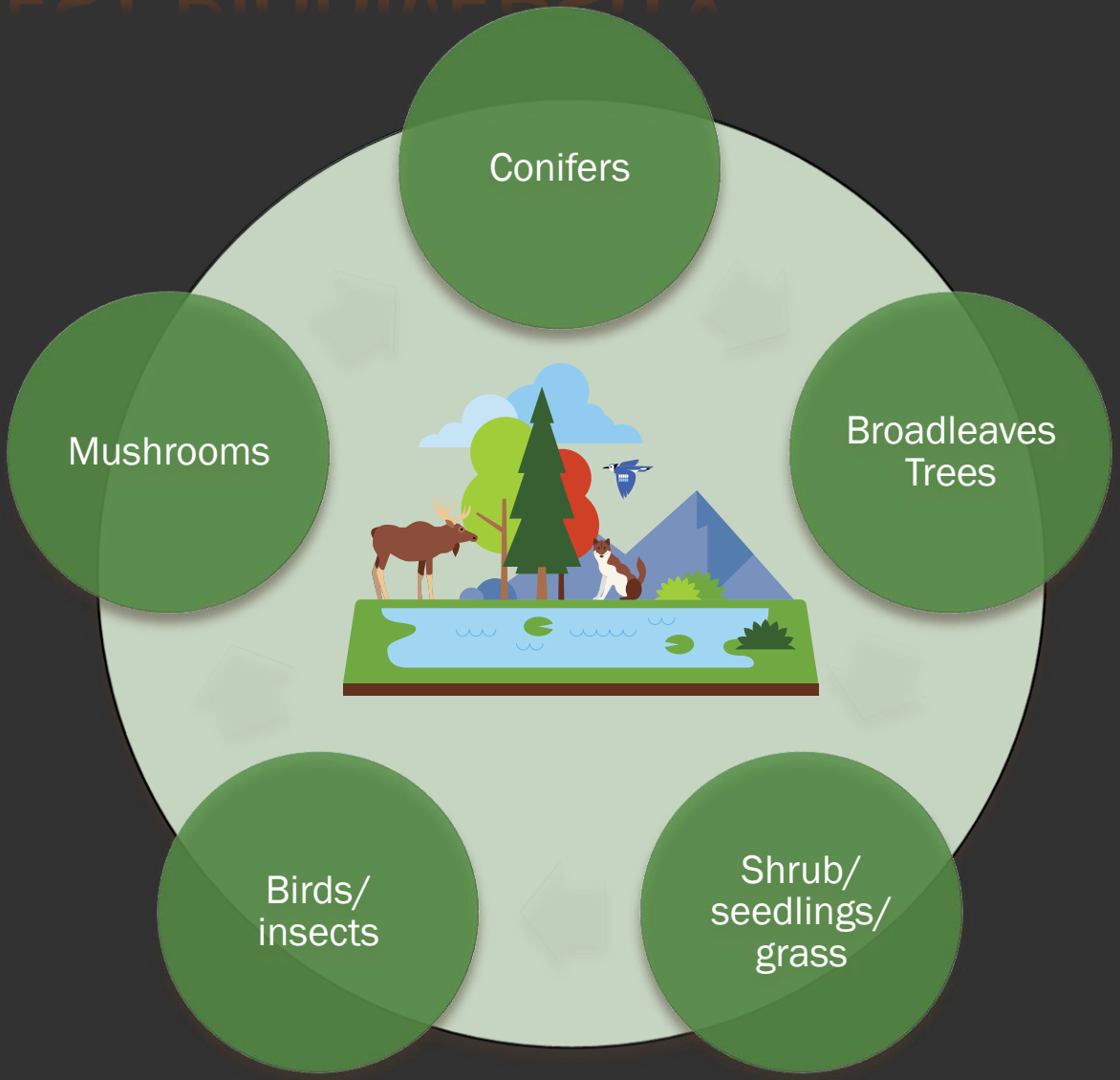
SOPHIA NO MORI

This is a field for environmental studies based on National Forest “Yu Yu No Mori” system.


FOREST BIODIVERSITY

VIDEO- SOPHIA FOREST

FOREST BIODIVERSITY



TREES


ミズキ
Cornus controversa


カラマツ
Larix kaempferi

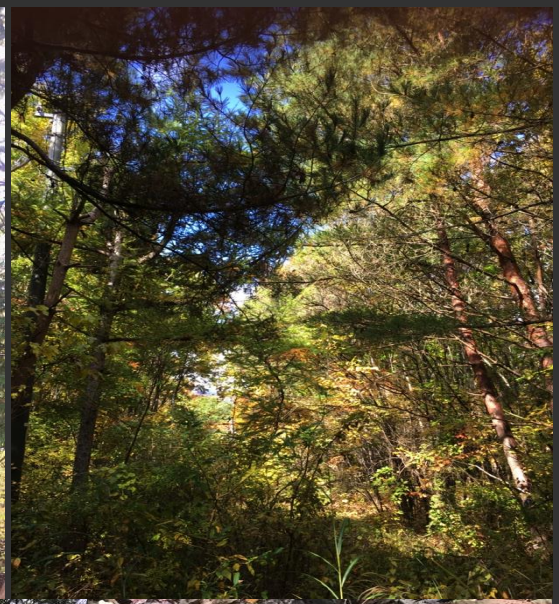

アカマツ
Pinus densiflora


コナラ
Quercus serrata


ウワミズザクラ
Padus grayana

CONIFERS




Akamatsu (Pinus densiflora), Momi (Abies), Karamatsu (Larix kaempferi)

BROADLEAFS TREES

BROADLEAFS TREES

URUSHI (ウルシ)

Scientific name: **Toxicodendron Vernicifluum**

English name: Lacquer Tree

Having poisonous, caused allergic property contact dermatitis (Rhus Rash)

BROADLEAFS TREES

KONARA (コナラ)

Scientific name: Quercus Serrata

The material is used for raw materials of charcoal and wood of shiitake mushrooms. In order to make many fungi and mycorrhiza, many fungal root mushrooms appear in the Quercus serrata forest.

BROADLEAFS TREES

MAPLE (モミジ)

Scientific name: Acer Sieboldianum

WHY LEAVES CHANGE COLOR?

During the spring and summer the leaves have served as factories where most of the foods necessary for the tree's growth are manufactured. This food-making process takes place in the leaf in numerous cells containing chlorophyll, which gives the leaf its green color.

But in the fall, because of changes in the length of daylight and changes in temperature, the leaves stop their food-making process.

The **chlorophyll breaks down**, the green color disappears, and the yellow to orange colors become visible and give the leaves part of their fall splendor.

MUSHROOMS

A mushroom is a spore- bearing fruiting body.

Way of spore spreading

MUSHROOMS







MUSHROOMS









MUSHROOMS







typically produced above ground on soil or on its food source (wooden trunk).

MUSHROOMS



A number of species of mushrooms are poisonous; although some resemble certain edible species, consuming them could be fatal. Eating mushrooms gathered in the wild is risky and should only be undertaken by individuals knowledgeable in mushroom identification.

SEEDLINGS, SHRUBS









Wasabi japonica, Nephrolepis cordifolia (fishbone fern)

FLOWERS

NUTS, FRUIT

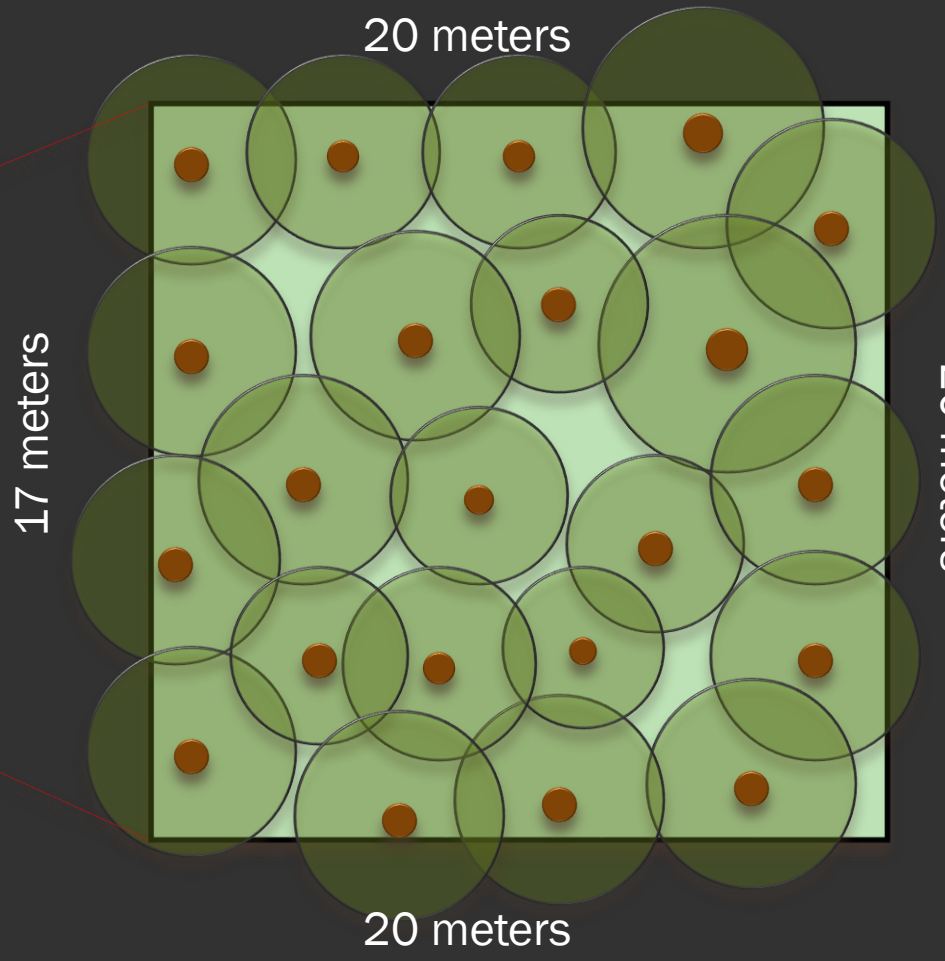




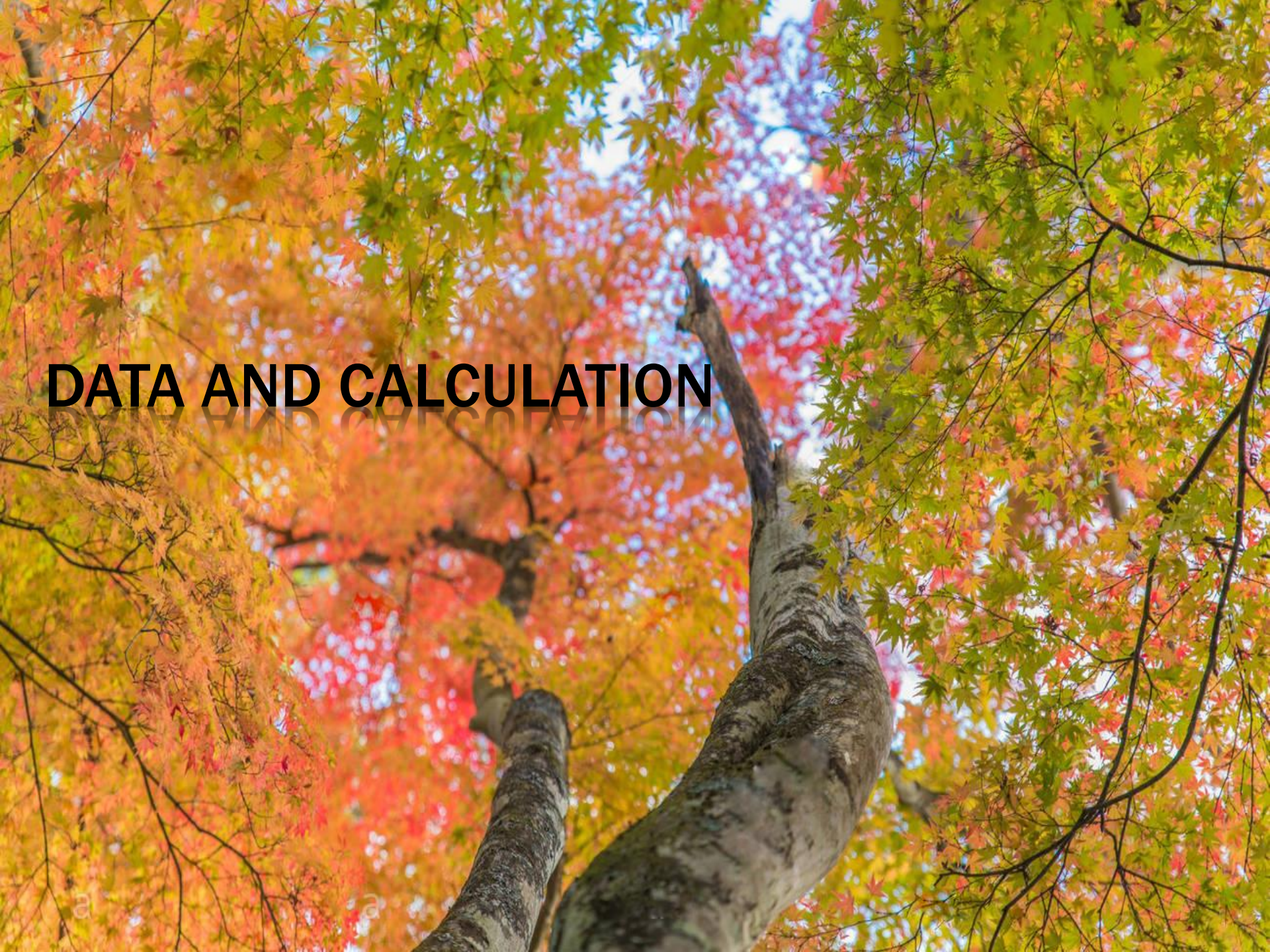

INSECTS, BIRDS

PLOT'S MAP

SOPHIA NO MORI

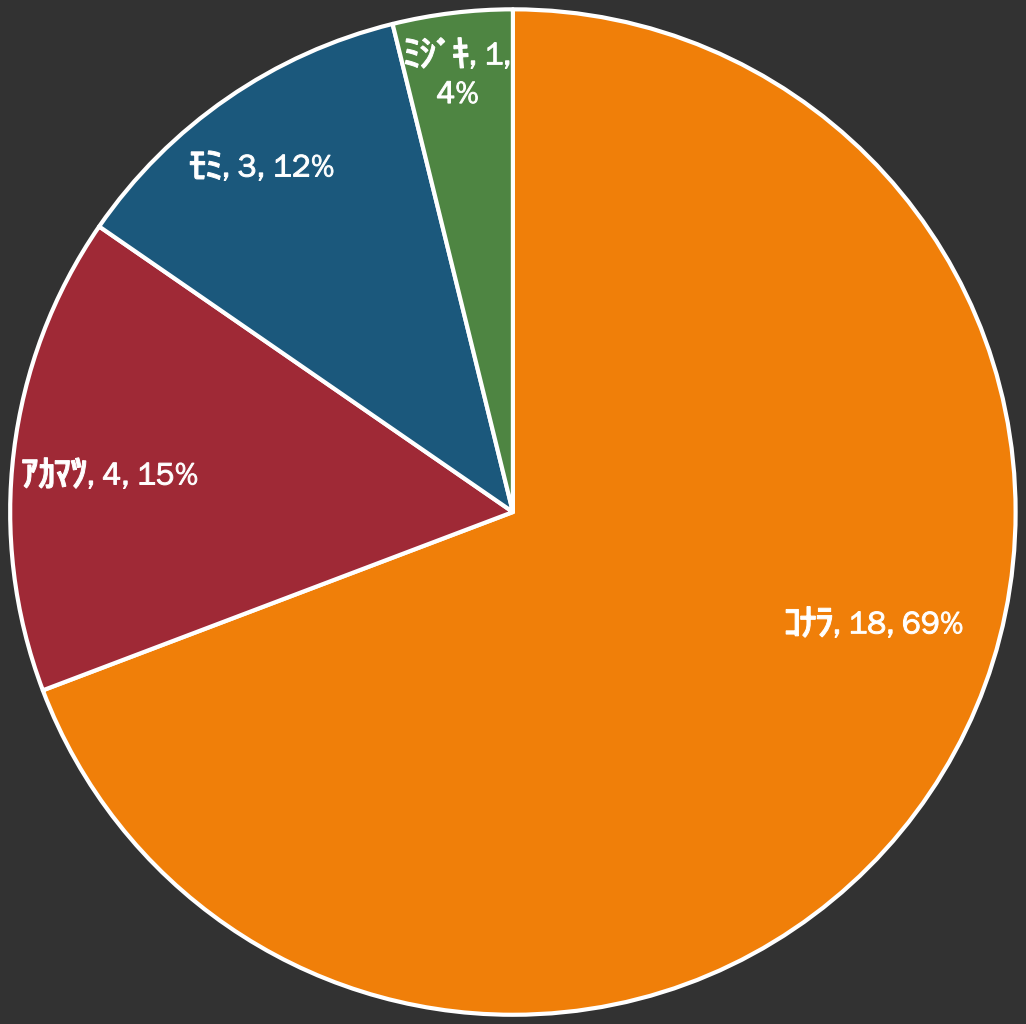


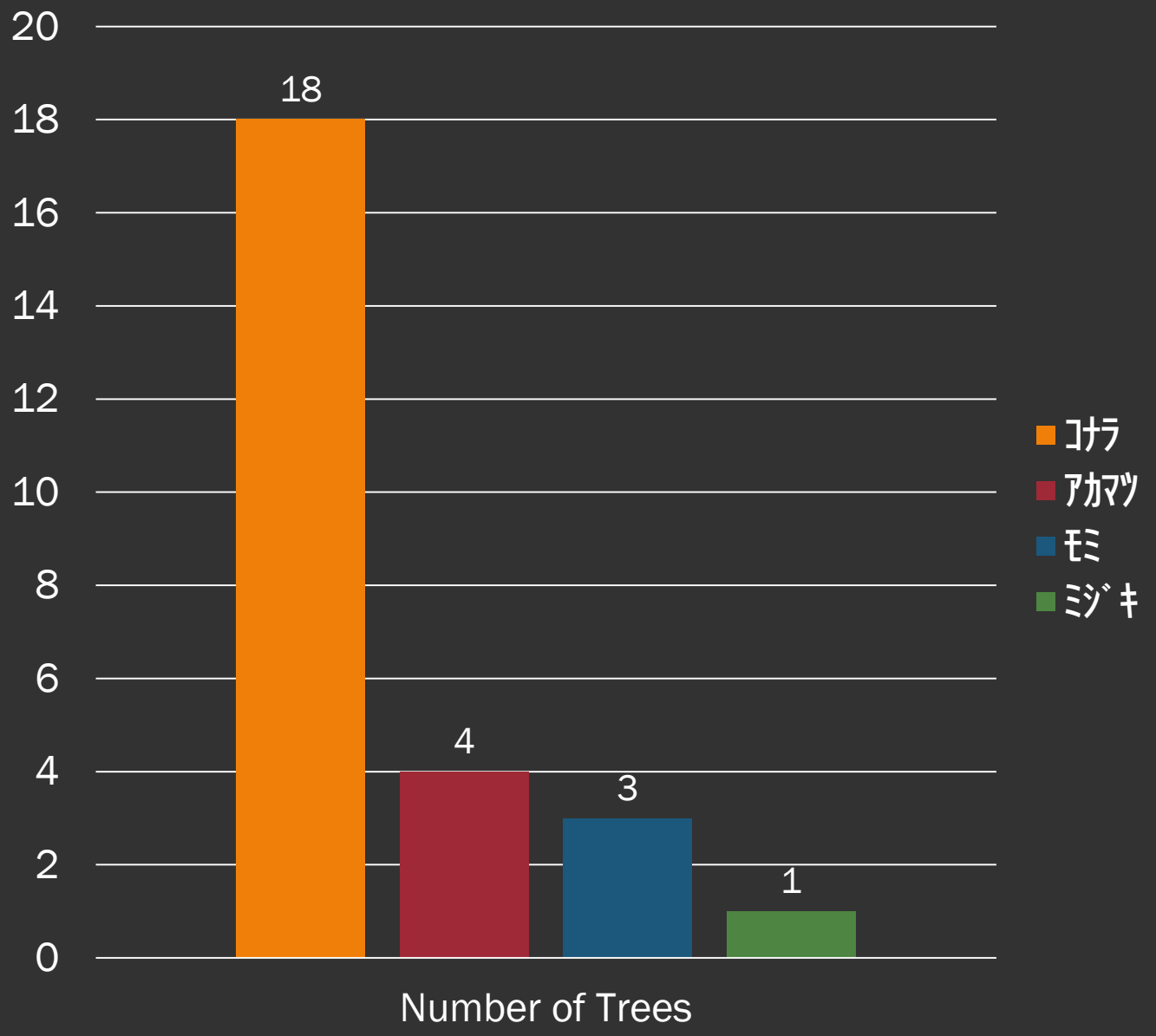
コナラ (Quercus serrata) is a dominant species in this plot


DATA AND CALCULATION

	Diamater (cm)	Hight (m)	Species	Sub-total basal area	Total amount of carbon	
1	29	18	ｱｶﾏﾂ	0.0660185	95.5990665	
2	18	15	ﾓﾐ	0.025434	102.0564368	
3	16	14	ﾓﾐ	0.020096		
4	22	19	ﾐｼﾞｷ	0.037994	110.7300276	
5	20	12	ｺﾅﾗ	0.0314		
	24	14		0.045216		
	25	15		0.0490625		
6	36	20	ｺﾅﾗ	0.101736	134.4104987	
7	38	23	ｺﾅﾗ	0.113354		
	32	20		0.080384		
8	32	19	ｱｶﾏﾂ	0.080384		
9	26	11	ｺﾅﾗ	0.053066		
10	20	11	ｺﾅﾗ	0.0314		
11	44	14	ｺﾅﾗ	0.151976		
12	32	11	ｺﾅﾗ	0.080384		
13	30	11	ｺﾅﾗ	0.07065		
14	27	14	ｺﾅﾗ	0.0572265		
15	26	16	ｱｶﾏﾂ	0.053066		
16	27	12	ｺﾅﾗ	0.0572265		
	20	10		0.0314		
17	33	16	ｺﾅﾗ	0.0854865		
	24	15		0.045216		
18	41	14	ｺﾅﾗ	0.1319585		
	39	12		0.1193985		
19	29	12	ﾓﾐ	0.0660185		
20	24	14	ｱｶﾏﾂ	0.045216		
	Average Tree Hight (m)	14.69231	胸高断面积合计 Total basal area of trees	1.730768	46.91826832	344.6688173
				m^2	m^2/ha	干材积合计 Total stem volume
			Plot area	368.89	m^2	

NUMBER OF TREES (DOMINANT SPECIES)




20
18
16
14
12
10
8
6
4
2
0
18
4
3
1
コナラ
アカマツ
モミ
ミジ キ
Number of Trees

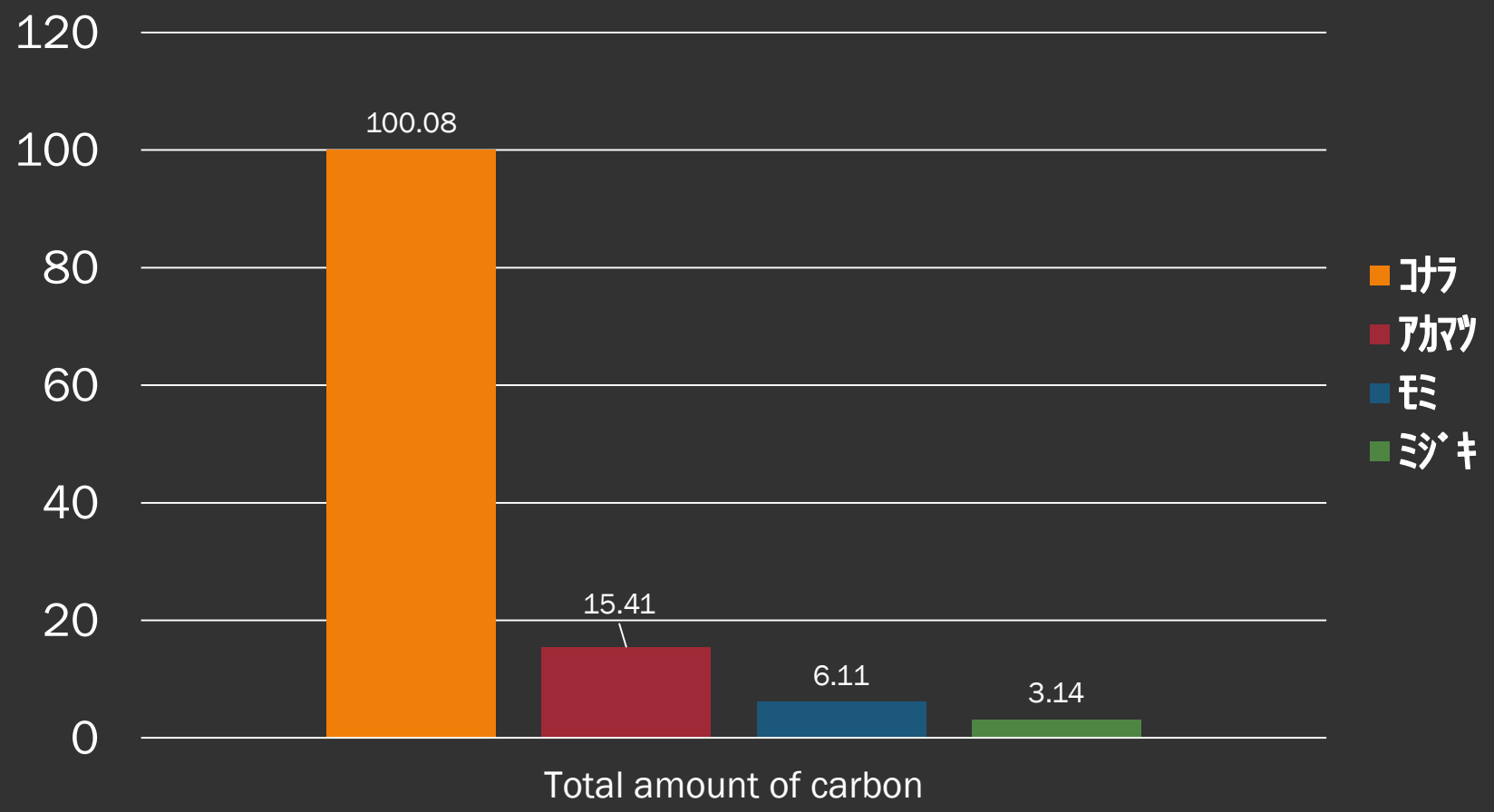
	Diamater (cm)	Hight (m)	Species	Sub-total basal area	Total amount of carbon	
1	18	15	モミ	0.025434	6.118399997	
2	16	14	モミ	0.020096		
3	29	12	モミ	0.0660185		
	Average Tree Hight (m)	13.66667	胸高断面積合計 Total basal area of trees	0.1115485	3.023896012	20.66328942
				m^2	m^2/ha	干材積合計 Total stem volume
			Plot Area (m^2)	368.89		

	Diamater (cm)	Hight (m)	Species	Sub-total basal area	Total amount of carbon	
1	22	19	ミジキ	0.037994	3.143439857	
	Average Tree Hight	19	胸高断面積合計 Total basal area of trees	0.037994	1.029954729	9.784569926
				m^2	m^2/ha	干材積合計 Total stem volume
			Plot Area (m^2)	368.89		

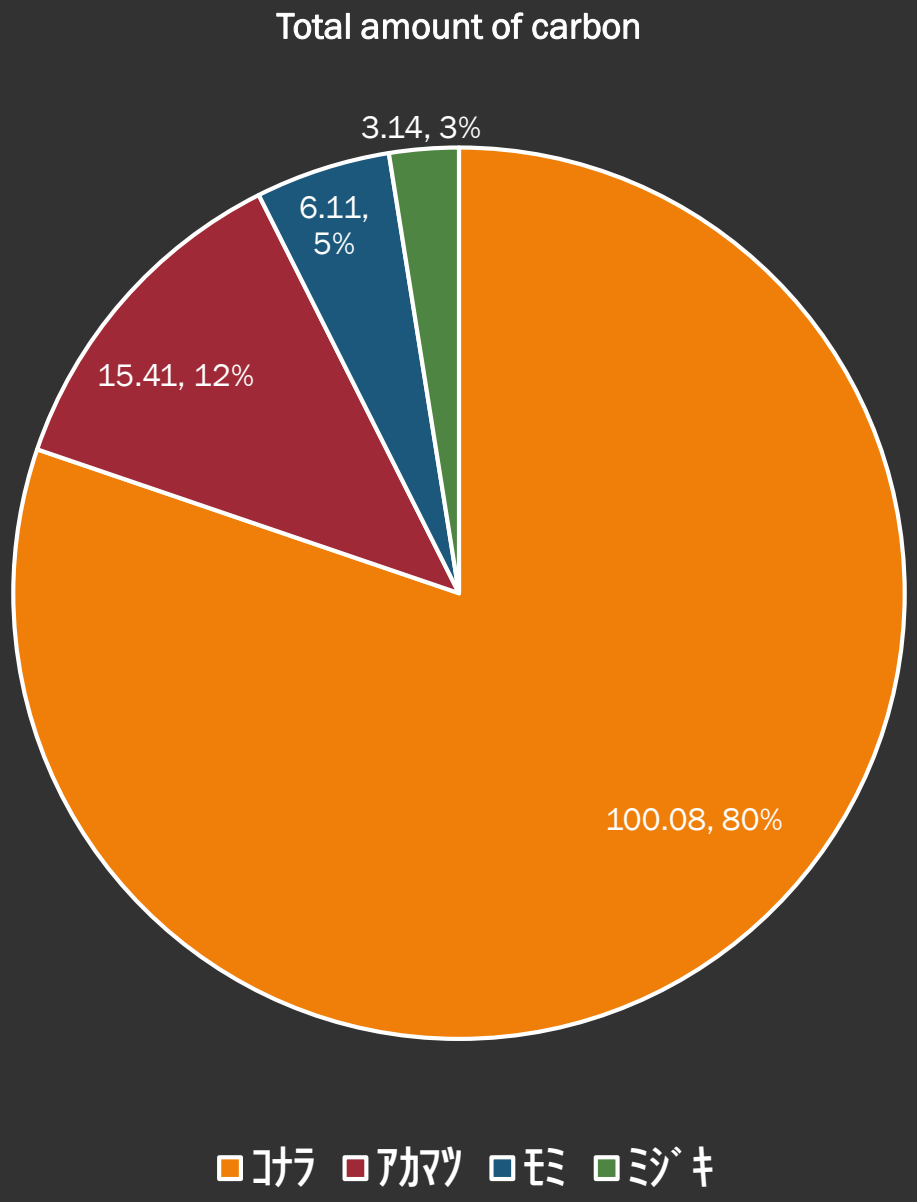
	Diamater (cm)	Hight (m)	Species	Sub-total basal area	Total amount of carbon	
1	29	18	アカマツ	0.0660185	15.4079922	
2	32	19	アカマツ	0.080384		
3	26	16	アカマツ	0.053066		
4	24	14	アカマツ	0.045216		
	Average Tree Hight (m)	16.75	胸高断面積合計 Total basal area of trees	0.2446845	6.632993575	55.55132119
				m^2	m^2/ha	干材積合計 Total stem volume
			Plot Area (m^2)	368.89		

	Diamater (cm)	Hight (m)	Species	Sub-total basal area	Total amount of carbon	
1	20	12	コナラ	0.0314		
2	24	14	コナラ	0.045216		
3	25	15	コナラ	0.0490625		
4	36	20	コナラ	0.101736	100.0816096	
5	38	23	コナラ	0.113354		
6	32	20	コナラ	0.080384		
7	26	11	コナラ	0.053066		
8	20	11	コナラ	0.0314		
9	44	14	コナラ	0.151976		
10	32	11	コナラ	0.080384		
11	30	11	コナラ	0.07065		
12	27	14	コナラ	0.0572265		
13	27	12	コナラ	0.0572265		
14	20	10	コナラ	0.0314		
15	33	16	コナラ	0.0854865		
16	24	15	コナラ	0.045216		
17	41	14	コナラ	0.1319585		
18	39	12	コナラ	0.1193985		
	Average Tree Hight (m)	14.16667	胸高断面積合計 Total basal area of trees	1.336541	36.231424	256.6392533
				m^2	m^2/ha	干材積合計 Total stem volume
			Plot Area (m^2)	368.89		

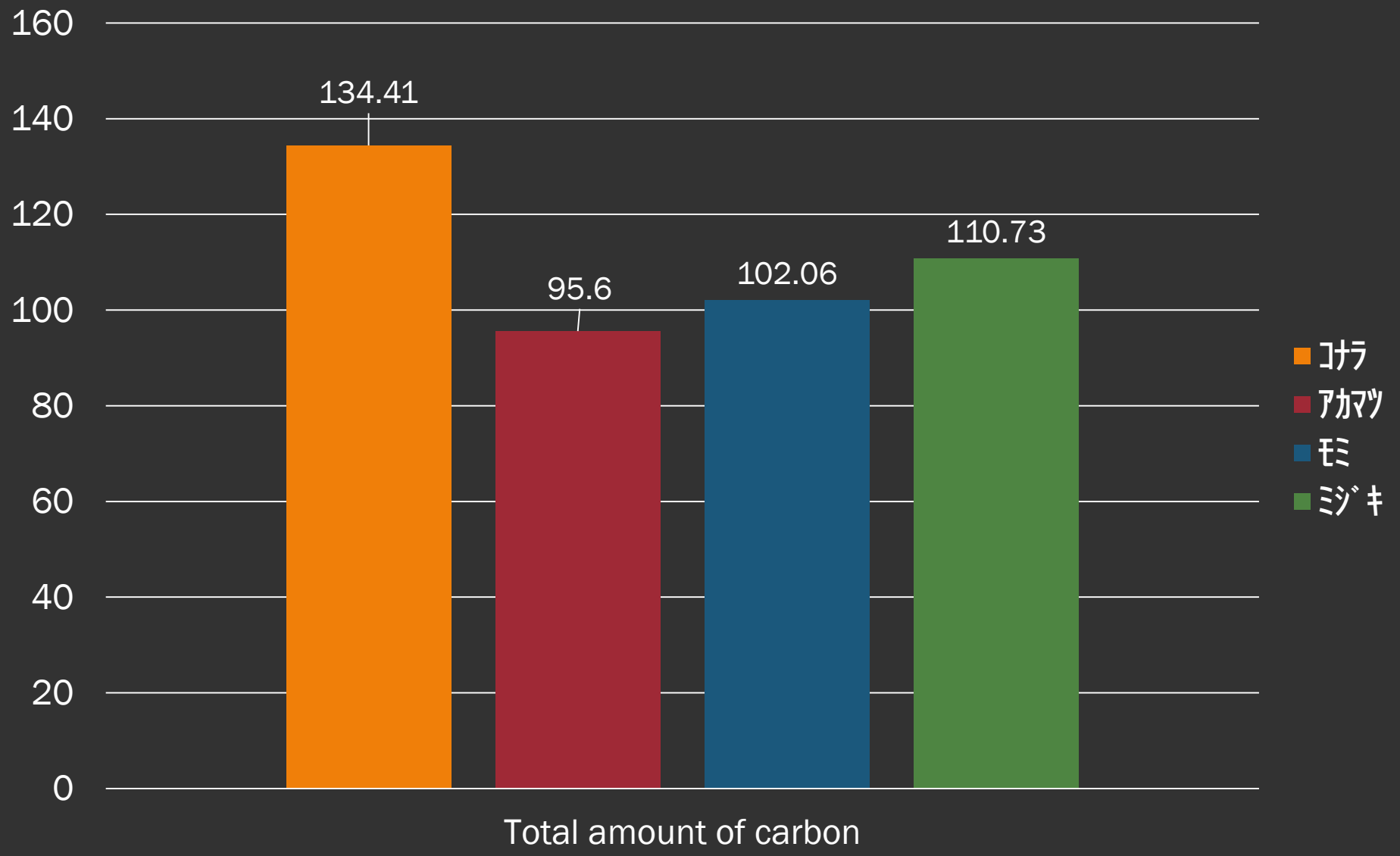
/HA


120
100
80
60
40
20
0
100.08
15.41
6.11
3.14
コナラ
アカマツ
モミ
ミジ゛キ
Total amount of carbon

/HA


Total amount of carbon
3.14, 3%
6.11, 5%
15.41, 12%
100.08, 80%
コナラ
アカマツ
モミ
ミジ キ

/HA, IF ONE SPECIES IN WHOLE AREA




CONCLUSION

IMPORTANCE OF CARBON ESTIMATES

- Calculate the carbon capture capacity of a forest area to estimate carbon sequestration
- Assess energy potential of a forest for energy production purposes
- Evaluate the general health of a forest and its function for providing habitat and niche fulfillment within the community and ecosystem
- Test the forests role in providing ecological services to humanity (Supporting, Regulating, Provisioning, Cultural; MEA)

CARBON ESTIMATE MODEL EVALUATION

- Considering the importance and uses of these estimates, we suggest a modification to the estimation model provided to a model that considers species, size, wood density, and abundance for a more precise estimate.
- The prior model is sufficient for a forest plantation where single species forests exist, nevertheless, in a natural forest, we considered the following model to be more applicable:

$$\sum_{s=1}^{n}(x_s \cdot V_t \cdot \rho_s \cdot k_s) \Big/ _{unit\ area} = \text{total carbon mass/unit area}$$

- x = species specific stem volume factor
- V = total stem volume
- ρ = species specific carbon density coefficient
- k = species specific adjustment coefficient for branches

FOREST RESOURCES FOR GENERATING POWER

- Assuming that there is an interest in using a forest area for energy production purposes, it is possible to estimate the amount of electricity that can be generated from X kg of C per area unit, the approximate energy conversions are:

  1kg Carbon ⇒ approx. 10,000 KJ of energy or 120 Kwh

- Considering the amount of time necessary for a forest to grow to this capacity and convert atmospheric carbon into burnable wood, it may be apparent that the time and effort to convert a forest into fuel is probably not as cost-effective as using other resources for generating power.

Thank you for your attention!