EDIBLE MUSHROOMS

BY DESIREE WOOD

STA4102 Final Project

The Defining Questions

- Are there features that identify edible mushrooms?
  - The common answer its no, but edible mushrooms still want to be found.
- What habitats are good for finding edible mushrooms?
  - Are there shared features amongst these habitats for edible mushrooms?

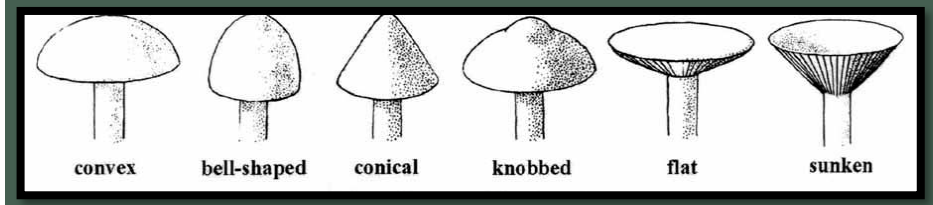
About the Data

- UCI Mushroom Data Set - drawn from The Audubon Society Field Guide to North American Mushrooms (1981). G. H. Lincoff (Pres.), New York: Alfred A. Knopf
- Categorical data with 8124 observations containing 22 different attributes of mushrooms.
- Contains data for 23 different species of gilled mushrooms apart of the Agaricus and Lepiota Family.

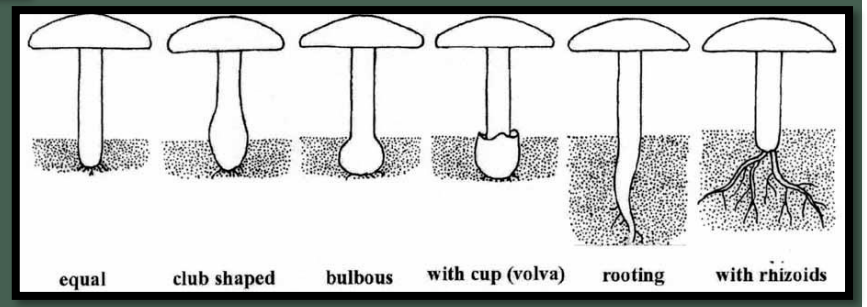
By Alan Rockefeller - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=90815639

By The original uploader was Vincenzomigliozzi at Italian Wikipedia. - originally uploaded as it:File:Lepiota lilacea.jpg, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=11321575

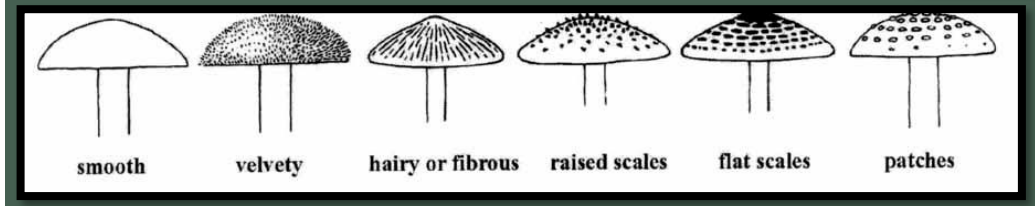
Cap Shape



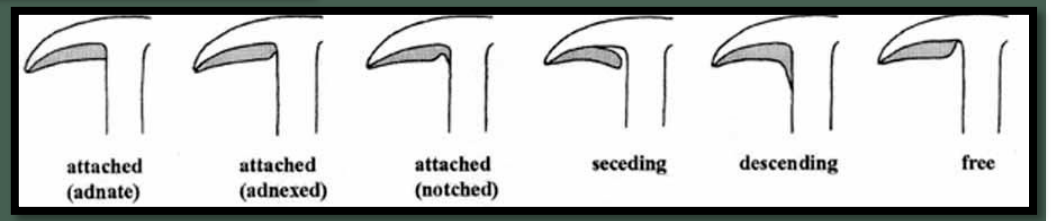
Stalk Root



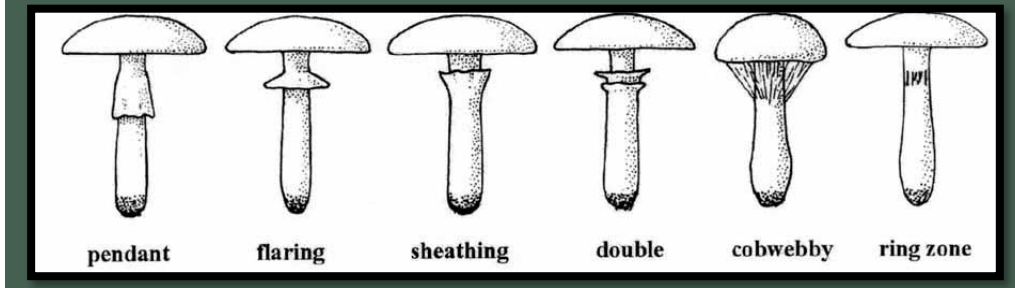
Cap Surface



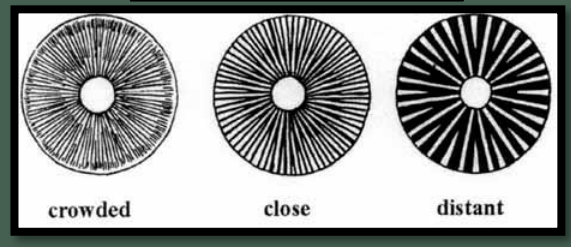
Gill Attachment



Ring Type



Gill Spacing



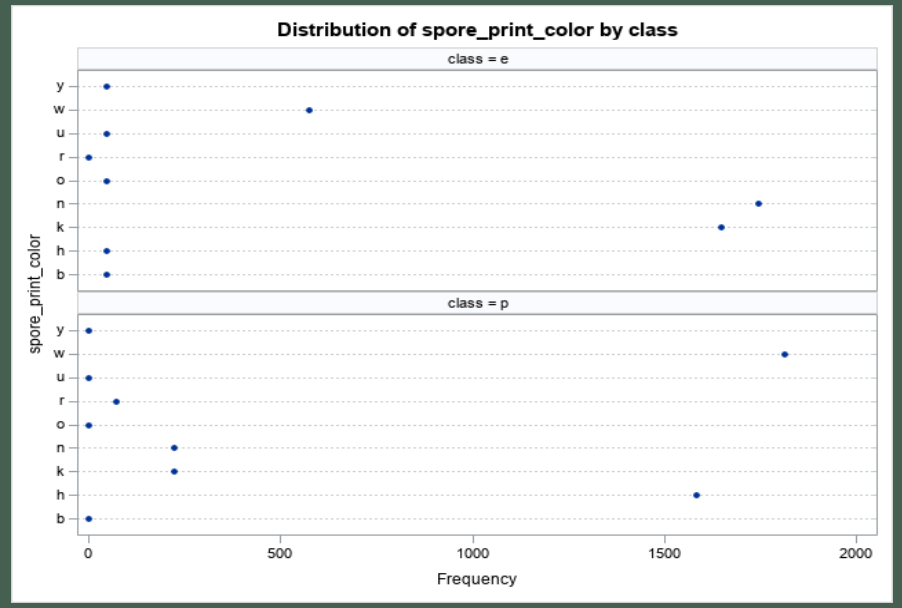
Mushroom Features

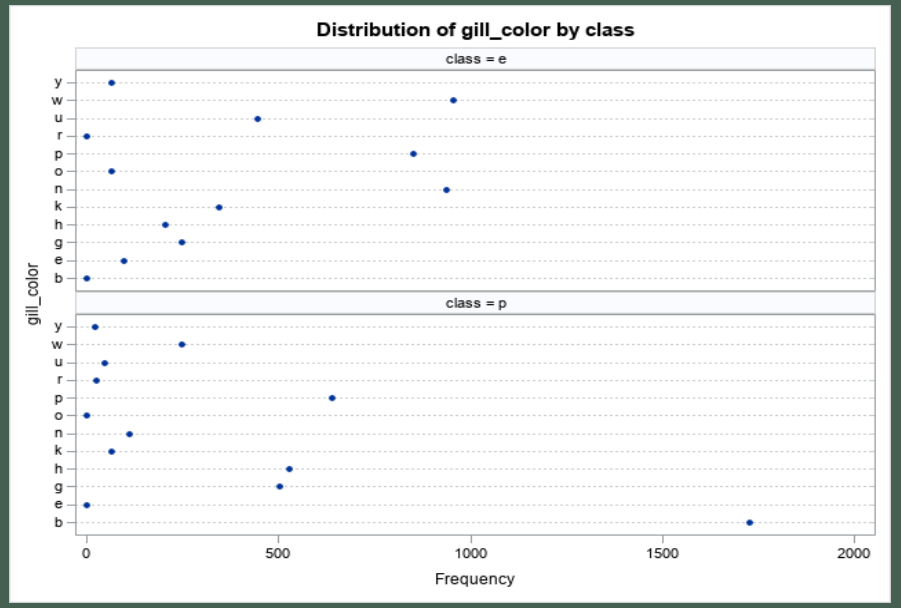
diagrams are modified from Lincoff, G. H. 1981 National Audubon Society Field Guide to North American Mushrooms. Alfred A. Knopf, New York. *https://www.usask.ca/biology/fungi/glossary.html*

- ☐ Cap Shape
- ☐ Stalk Root
- ☐ Cap Surface
- ☐ Gill Attachment
- ☐ Ring Type
- ☐ Gill Spacing
- ☐ Cap Color
- ☐ Bruises
- ☐ Odor
- ☐ Gill Size
- ☐ Gill Color
- ☐ Stalk Shape
- ☐ Stalk Surface
- ☐ Stalk Color
- ☐ Veil Type
- ☐ Veil Color
- ☐ Ring Number
- ☐ Spore Color
- ☐ Population
- ☐ Habitat

Methods for Analysis

- Check for missing data – only one variable has missing data
  - Dropped Stalk Root variable from analysis
- Find dependent Variables with Proc Freq and Cramer's V >.5
  - Odor, Spore Print Color, Gill Color and ring type all above .6
  - Stalk Surface, Gill Size, Stalk Color, Bruises all above .5


Distribution of spore_print_color by class
class = e
class = p
spore_print_color
y
w
u
r
o
n
k
h
b
0
500
1000
1500
2000
Frequency


Distribution of gill_color by class
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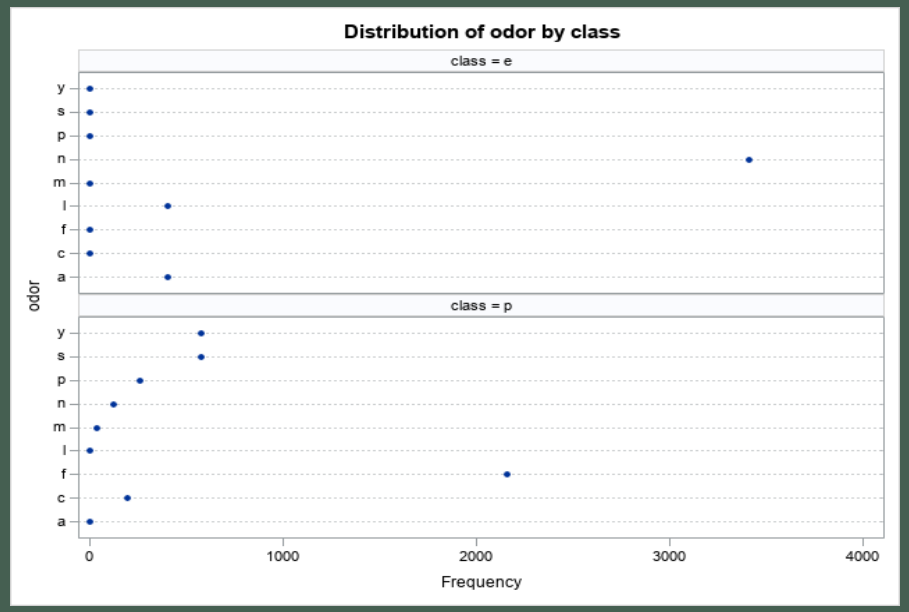
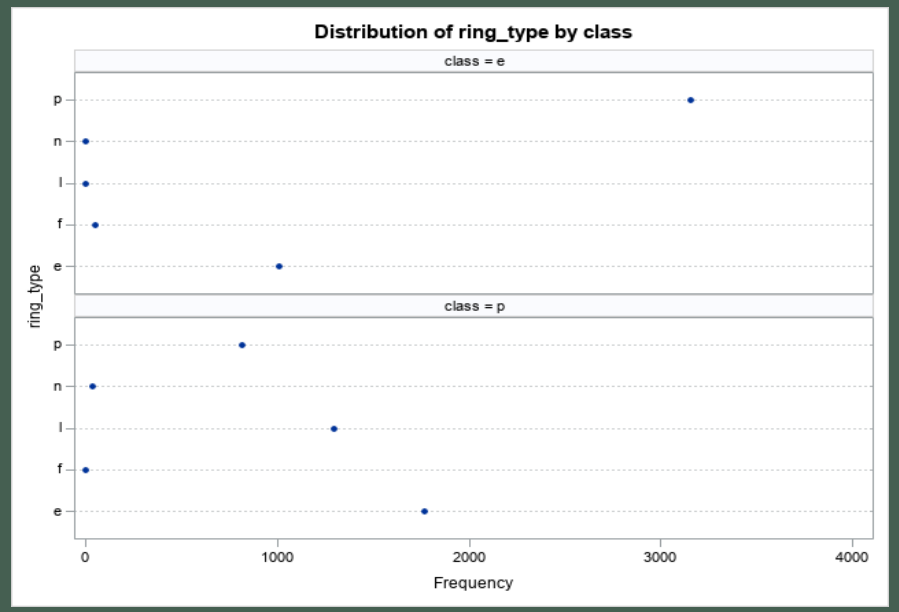
class = p
gill_color
y
w
u
r
p
o
n
k
h
g
e
b
0
500
1000
1500
2000
Frequency

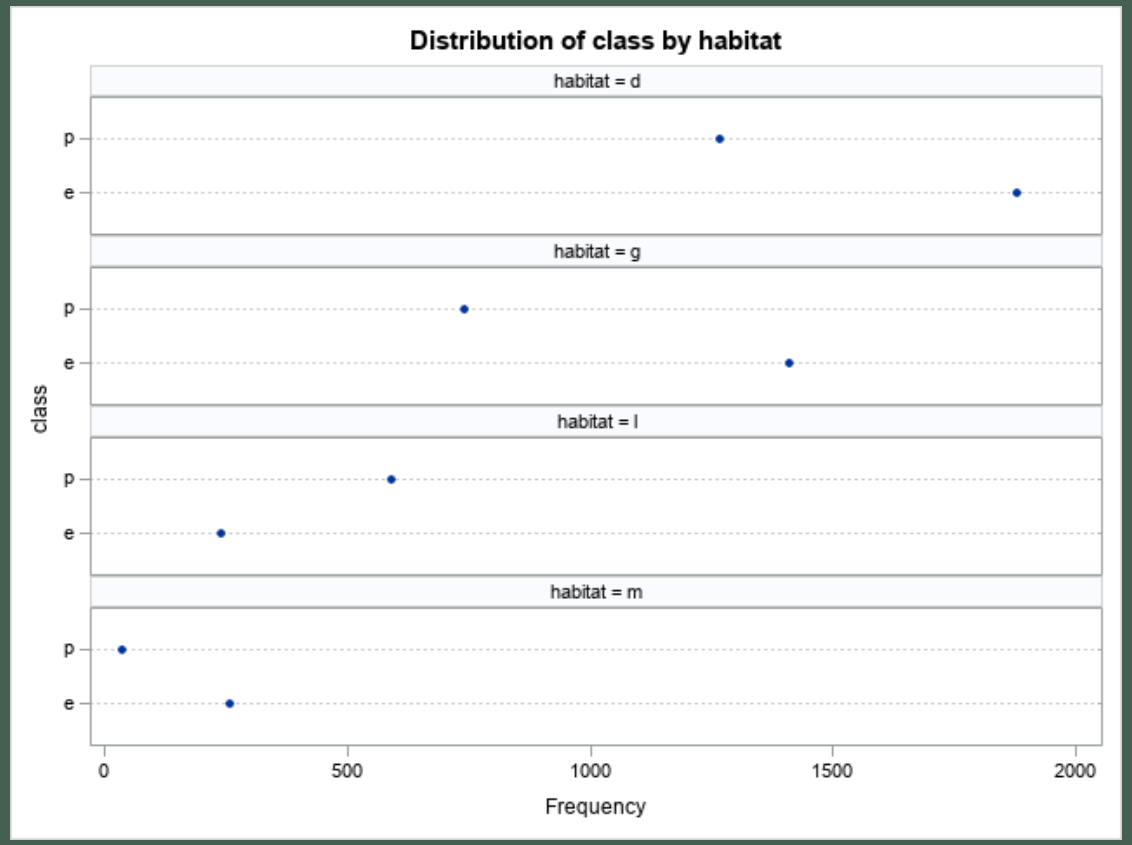

Distribution of odor by class
class = e
class = p
odor
y
s
p
n
m
l
f
c
a
0
1000
2000
3000
4000
Frequency

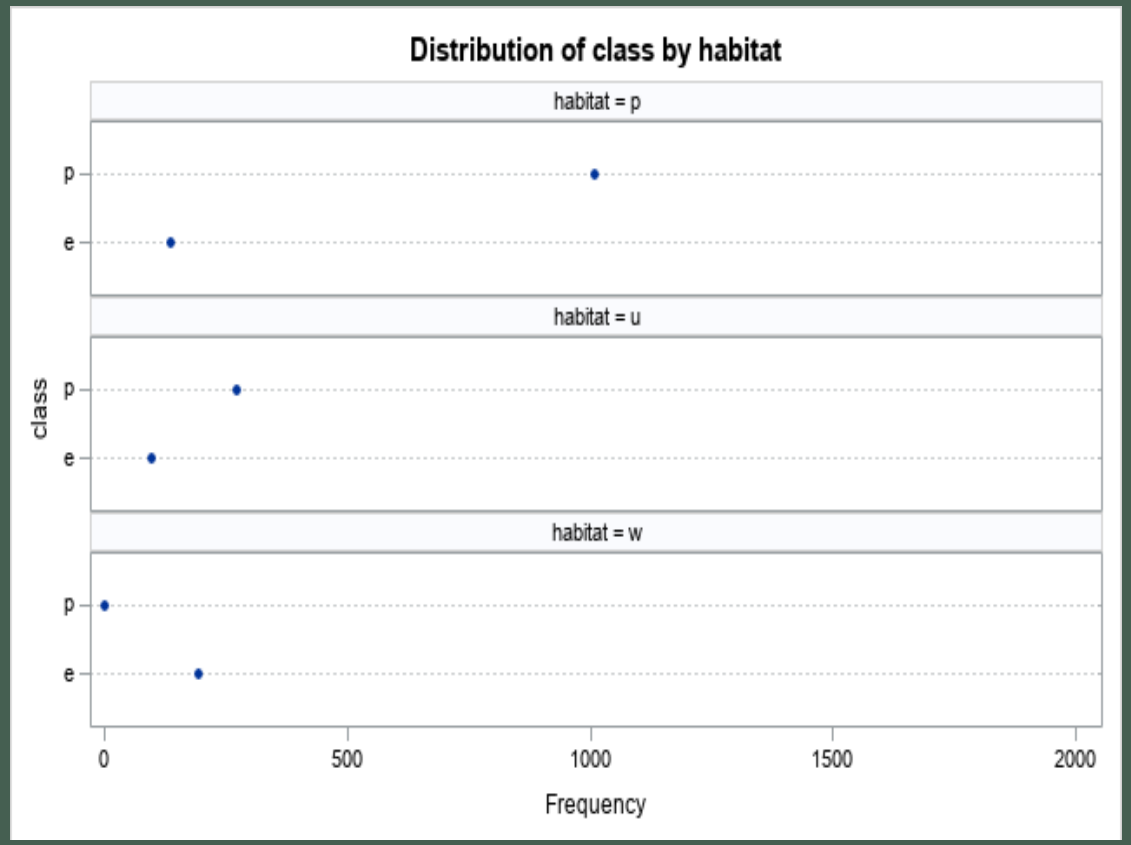

Distribution of ring_type by class
class = e
class = p
ring_type
p
n
l
f
e
0
1000
2000
3000
4000
Frequency

Edible Frequency by Habitat

Frequency Percent Row Pct Col Pct	Table of class by habitat							
	habitat							
class	d	g	l	m	p	u	w	Total
e	1880 23.14 44.68 59.72	1408 17.33 33.46 65.55	240 2.95 5.70 28.85	256 3.15 6.08 87.67	136 1.67 3.23 11.89	96 1.18 2.28 26.09	192 2.36 4.56 100.00	4208 51.80
p	1268 15.61 32.38 40.28	740 9.11 18.90 34.45	592 7.29 15.12 71.15	36 0.44 0.92 12.33	1008 12.41 25.74 88.11	272 3.35 6.95 73.91	0 0.00 0.00 0.00	3916 48.20
Total	3148 38.75	2148 26.44	832 10.24	292 3.59	1144 14.08	368 4.53	192 2.36	8124 100.00

- Places to avoid based on frequency: leaves, paths, urban
- Promising Places: grasses, meadows, waste


Distribution of class by habitat
habitat = d
habitat = g
habitat = l
habitat = m
class
p
e
0
500
1000
1500
2000
Frequency


Distribution of class by habitat
habitat = p
habitat = u
habitat = w
class
p
e
0
500
1000
1500
2000
Frequency

Data Summary			
Response	class	Response Levels	2
Weight Variable	None	Populations	7
Data Set	MUSH_IMPORTANT	Total Frequency	8124
Frequency Missing	0	Observations	8124

Population Profiles		
Sample	habitat	Sample Size
1	u	368
2	g	2148
3	m	292
4	d	3148
5	p	1144
6	w	192
7	l	832

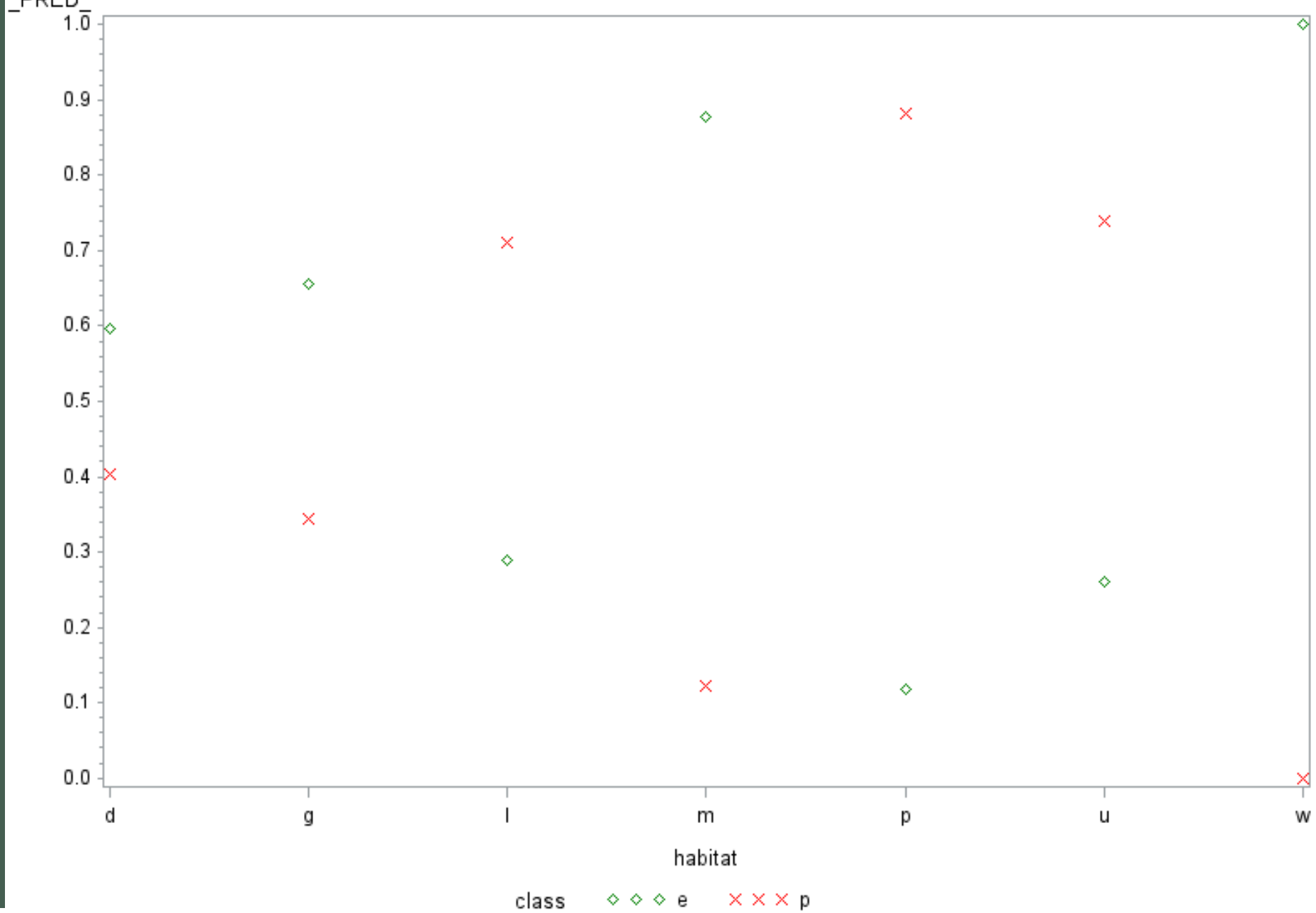
Response Profiles	
Response	class
1	p
2	e

Maximum Likelihood Analysis
Maximum likelihood computations converged.

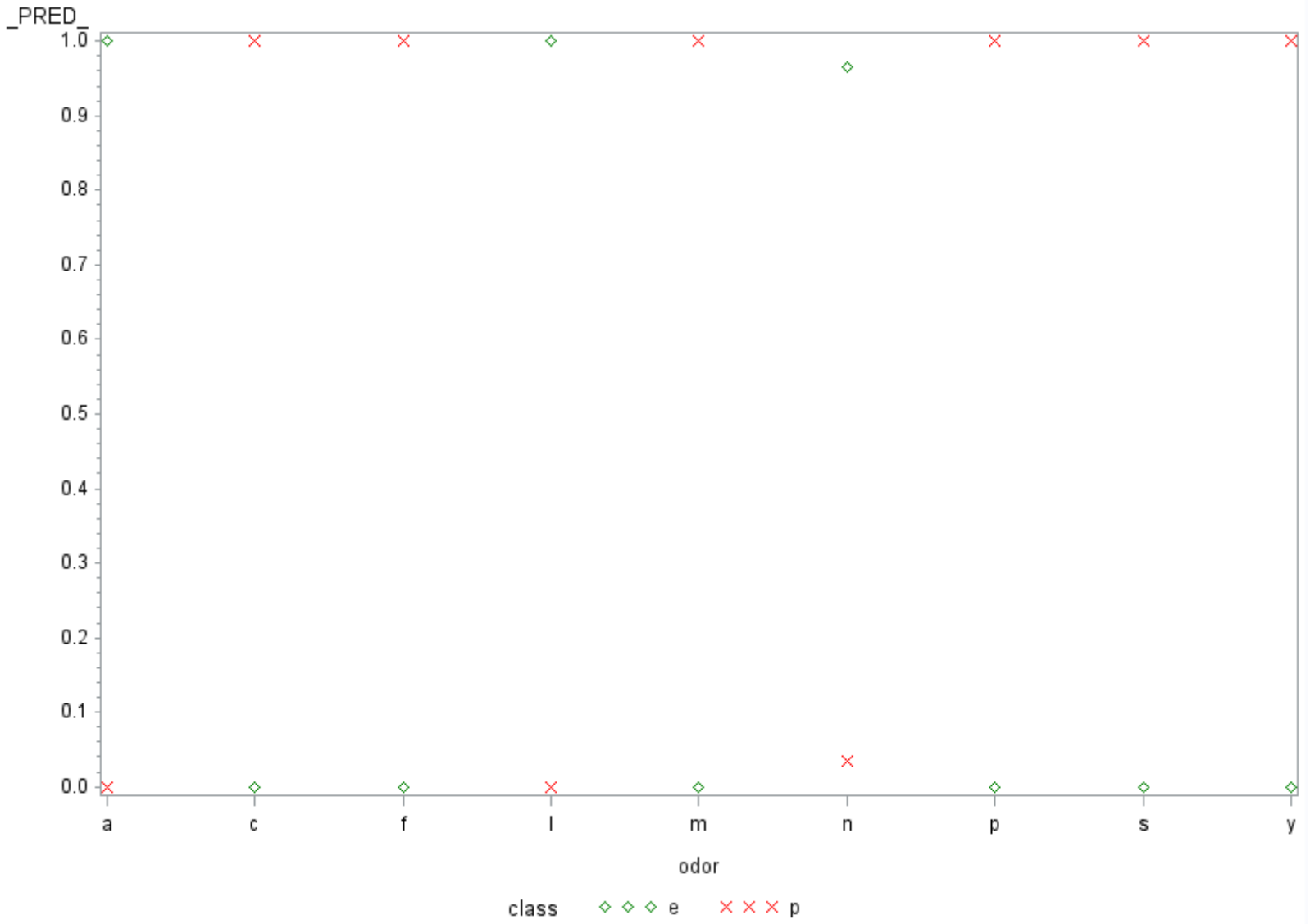
MODEL WITH CATMOD

Maximum Likelihood Predicted Values for Probabilities						
		Observed		Predicted		
habitat	class	Probability	Standard Error	Probability	Standard Error	Residual
u	p	0.7391	0.0229	0.7391	0.0229	0
	e	0.2609	0.0229	0.2609	0.0229	0
g	p	0.3445	0.0103	0.3445	0.0103	0
	e	0.6555	0.0103	0.6555	0.0103	0
m	p	0.1233	0.0192	0.1233	0.0192	0
	e	0.8767	0.0192	0.8767	0.0192	0
d	p	0.4028	0.0087	0.4028	0.0087	0
	e	0.5972	0.0087	0.5972	0.0087	0
p	p	0.8811	0.0096	0.8811	0.0096	0
	e	0.1189	0.0096	0.1189	0.0096	0
w	p	0	0	92E-9	133E-7	-92E-9
	e	1	0	1	133E-7	92E-9
l	p	0.7115	0.0157	0.7115	0.0157	0
	e	0.2885	0.0157	0.2885	0.0157	0

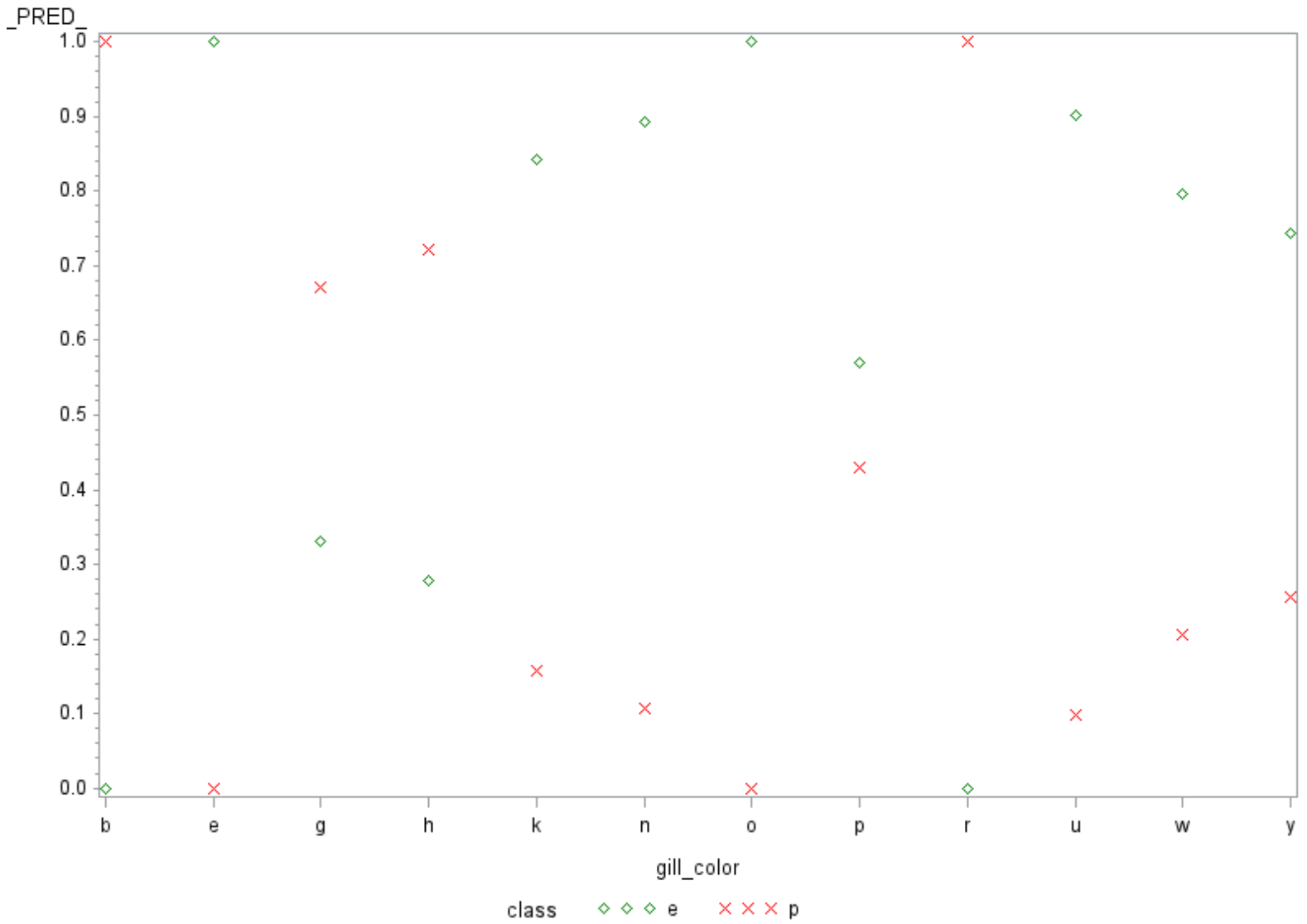
PREDICTED PROBABILITIES


PRED
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
d
g
l
m
p
u
w
habitat
class
e
p

ODOR & GILL COLOR EDIBLE TRAITS

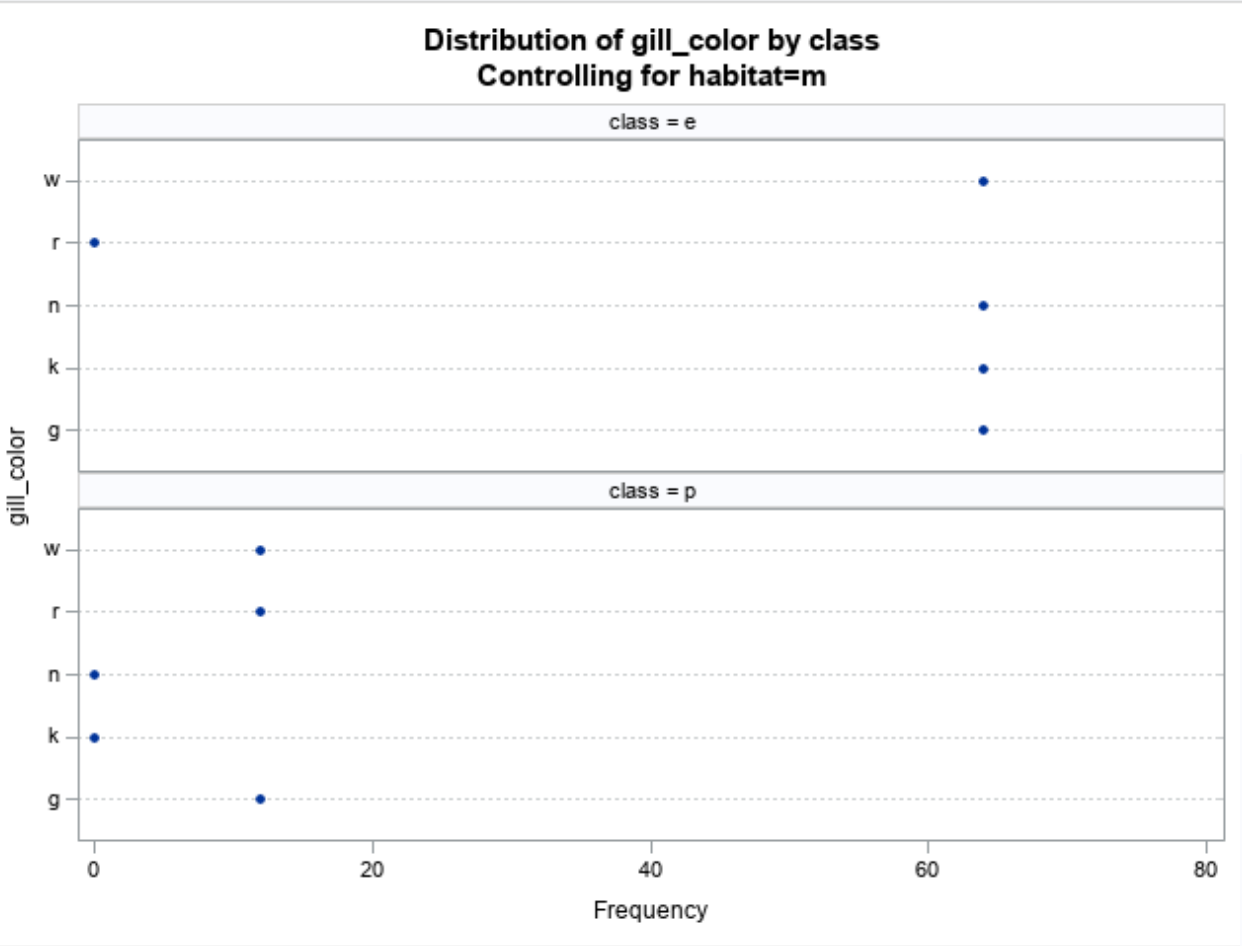


- Edible Leaning:
- Almond
- Anise
- None



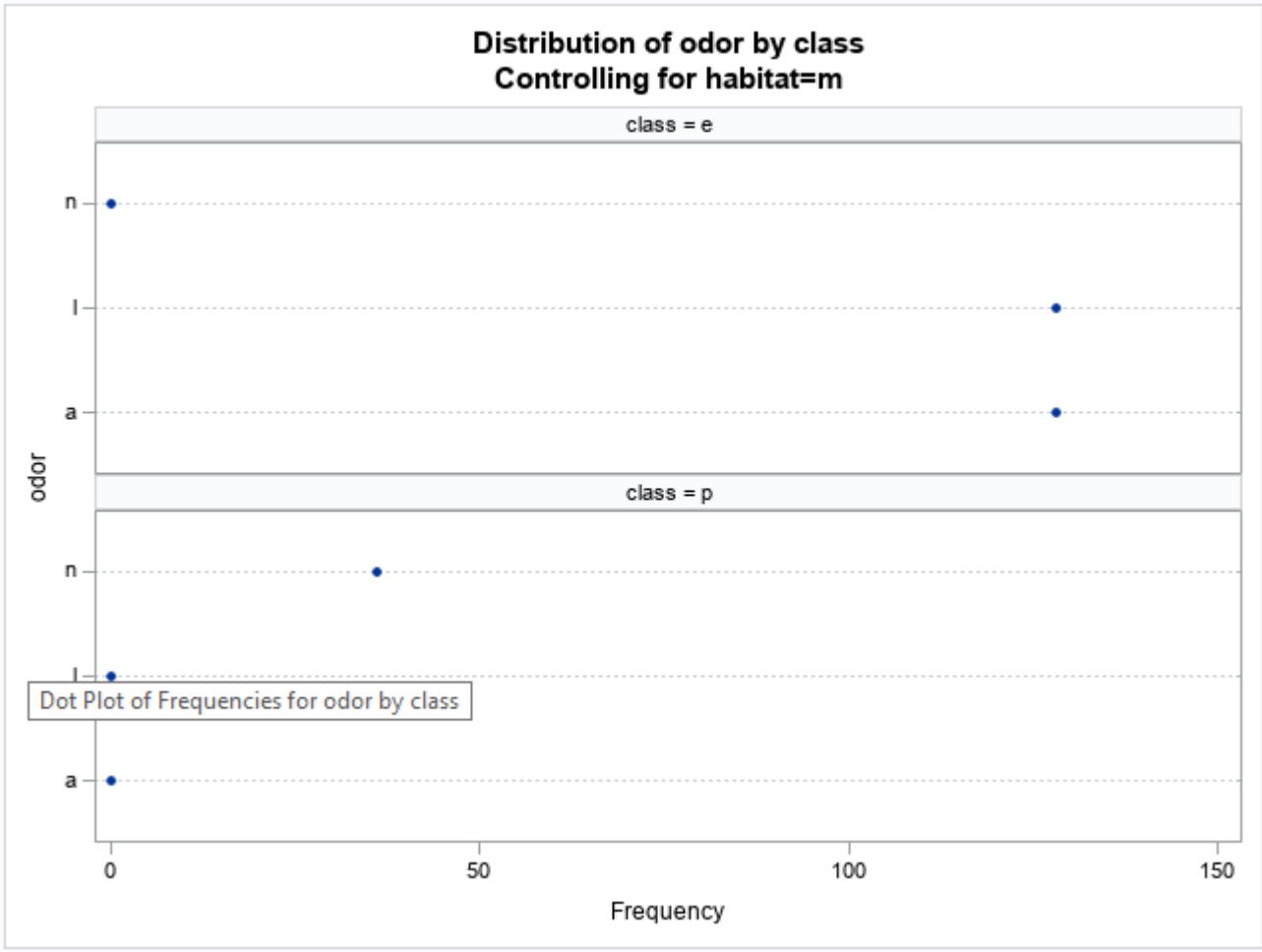
- Edible leaning:
- Red
- Black
- Brown
- Orange
- Purple
- White
- Yellow

HABITATS AND EDIBLE TRAITS



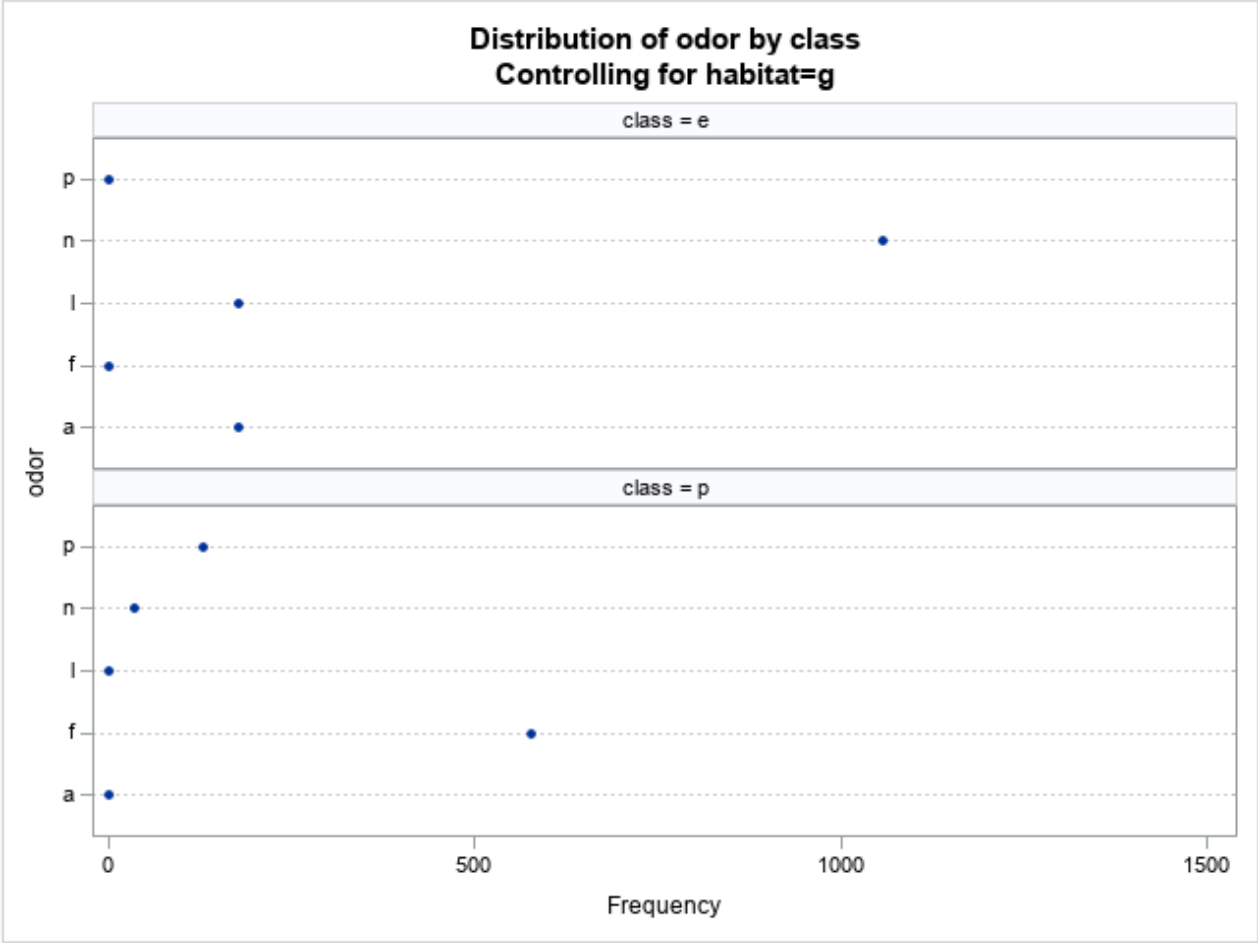
Meadows

- In meadows mushrooms with the gill colors white, brown, black, and grey tend to be more likely edible
- Their smells will likely be anise or almond

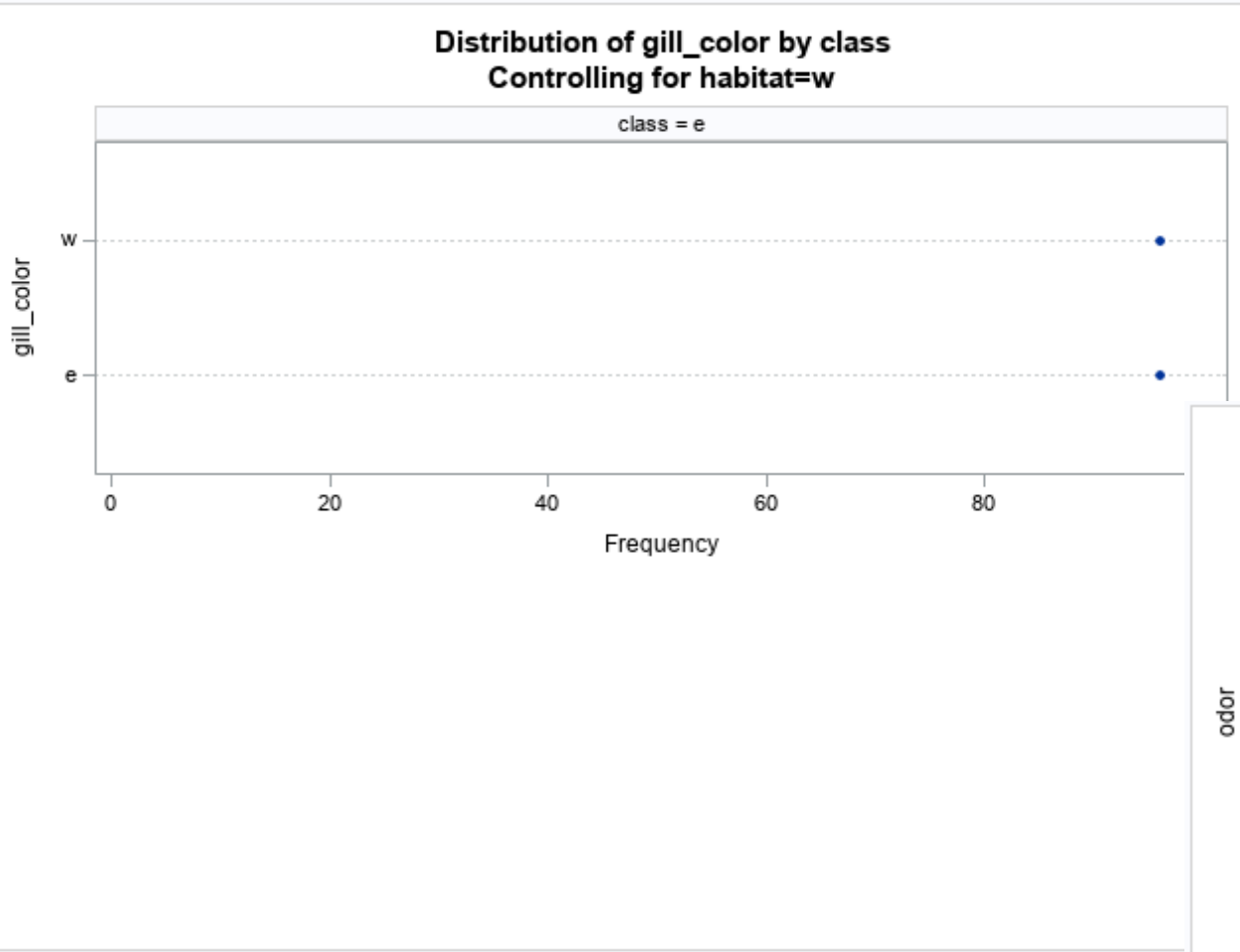


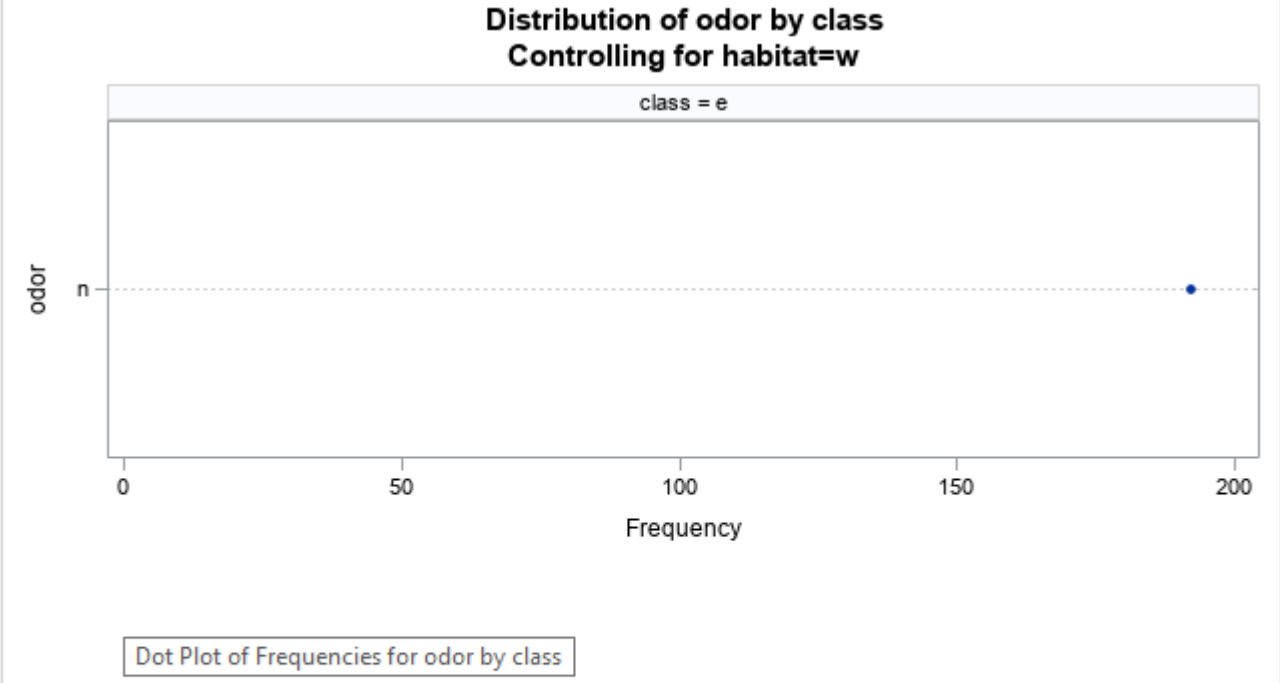
Grasses

- In grasses mushrooms with the gill colors brown and black, tend to be more likely edible
- Likely to have no smell



Waste





Dot Plot of Frequencies for odor by class

- Mushrooms in waste are should always be edible

Conclusion

While some taints show a dependance on being edible or not. There is no defining broad answer

A few areas are more likes meadows, grasses and waste are more likely to edible mushrooms than other habitats

There are some common features that indicate a mushrooms is edible

Always verify the mushroom's species before consuming