HW2

Summary of Mushroom

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2025-03-20

目錄

1. Variable Definition

Variable	Data Type	Definition
family	character	The family of the mushroom.
name	character	The name of the mushroom.
class	categorical	edible=e, poisonous=p.
cap-diameter (m)	numerical	Number(s) in cm. Two values = min max, one value = mean.
cap-shape (n)	categorical	bell = b, conical = c, convex = x, flat = f, sunken = s, spherical = p, others = o.
cap-surface (n)	categorical	fibrous = i, grooves = g, scaly = y, smooth = s, shiny = h, leathery = l, silky = k, sticky = t, wrinkled = w, fleshy = e.
cap-color (n)	categorical	brown = n, buff = b, gray = g, green = r, pink = p, purple = u, red = e, white = w, yellow = y, blue = l, orange = o, black = k.
does-bruise-bleed (n)	categorical	bruises-or-bleeding = t, no = f.
gill-attachment (n)	categorical	adnate = a, adnexed = x, decurrent = d, free = e, sinuate = s, pores = p, none = f, unknown = ?.
gill-spacing (n)	categorical	close = c, distant = d, none = f.
gill-color (n)	categorical	see cap-color + none = f.
stem-height (m)	numerical	Number(s) in cm. Two values = min max, one value = mean.
stem-width (m)	numerical	Number(s) in mm. Two values = min max, one value = mean.
stem-root (n)	categorical	bulbous = b, swollen = s, club = c, cup = u, equal = e, rhizomorphs = z, rooted = r.
stem-surface (n)	categorical	see cap-surface + none = f.
stem-color (n)	categorical	see cap-color + none = f.
veil-type (n)	categorical	partial = p, universal = u.
veil-color (n)	categorical	see cap-color + none = f.

has-ring (n)	categorical	ring = t, none = f.
ring-type (n)	categorical	cobwebby = c, evanescent = e, flaring = r, grooved = g, large = l, pendant = p, sheathing = s, zone = z, scaly = y, movable = m, none = f, unknown = ?.
spore-print-color (n)	categorical	see cap-color.
habitat (n)	categorical	grasses = g, leaves = l, meadows = m, paths = p, heaths = h, urban = u, waste = w, woods = d.
season (n)	categorical	spring = s, summer = u, autumn = a, winter = w.

表 1: Mushroom Data Dictionary

2. Data discription

```
library(Hmisc)
library(dplyr)
library(reticulate)
library(stringr)

df <- read.csv("C:/Users/tammy/Desktop/  /  /  /mushroom/primary_data.csv", sep = ";")

desc_stats <- describe(df)

latex(desc_stats, descript = "Descriptive Statistics", file = '', caption.placement = "top")
```

df
23 Variables 173 Observations

family

n	missing	distinct
173	0	23

```
lowest : Amanita Family     Bolbitius Family   Bolete Family      Bracket Fungi      Chanterelle Family
highest: Russula Family     Saddle-Cup Family  Stropharia Family  Tricholoma Family  Wax Gill Family
```

name

n	missing	distinct
173	0	173

```
lowest : Amethyst Deceiver        Aniseed Funnel Cap       Apricot Fungus           Bare-toothed Russula     Bay Bolete
highest: Yellow-gilled Russula    Yellow-staining Mushroom Yellow-stemmed Bell Cap  Yellow Swamp Russula     Yellow Wax cap
```

class

n	missing	distinct
173	0	2

```
Value          e     p
Frequency     77    96
Proportion 0.445 0.555
```

cap.diameter

n	missing	distinct
173	0	51

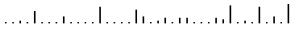
```
lowest : [0.4, 1]   [0.5, 1.5] [0.5, 1]   [0.7, 1.3] [1, 1.5]
highest: [8, 14]    [8, 15]    [8, 20]    [8, 25]    [8, 30]
```

cap.shape

n	missing	distinct
173	0	27

```
lowest : [b, f, s] [b, f]     [b, x, f] [b, x]     [b]
highest: [x, f]    [x, o]     [x, p]    [x, s]     [x]
```

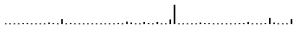
Cap.surface



n	missing	distinct
133	40	40

```
lowest : [d, e, y, i] [d, k, s]    [d, k]       [d, s]       [d]
highest: [t]          [w, t]       [w]          [y, s]       [y]
```

cap.color



n	missing	distinct
173	0	67

```
lowest : [b, p, e, y]    [b, u]          [b]             [e, n, p, w]    [e, n, y]
highest: [y, n]          [y, o, g, n, r] [y, o, r, n]    [y, o]          [y]
```

does.bruise.or.bleed

n	missing	distinct
173	0	2

Value	[f]	[t]
Frequency	143	30
Proportion	0.827	0.173

gill.attachment

n	missing	distinct
145	28	8

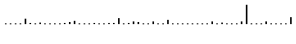
Value	[a, d]	[a]	[d]	[e]	[f]	[p]	[s]	[x]
Frequency	8	32	25	16	10	17	16	21
Proportion	0.055	0.221	0.172	0.110	0.069	0.117	0.110	0.145

gill.spacing

n	missing	distinct
102	71	3

Value	[c]	[d]	[f]
Frequency	70	22	10
Proportion	0.686	0.216	0.098

gill.color



n	missing	distinct
173	0	59

```
lowest : [b, p, w] [b, u]    [b]       [e]       [f]
highest: [y, o, e] [y, r, k] [y, r]    [y, w]    [y]
```

stem.height

n	missing	distinct
173	0	46

```
lowest : [0]      [1, 2]   [1, 3]   [10, 12] [10, 15], highest: [8, 12]  [8, 15]  [8, 20]  [8, 25]  [8, 30]
```

stem.width

n	missing	distinct
173	0	48

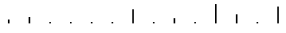
```
lowest : [0.5, 1] [0]      [1, 2]   [1, 3]   [1]     , highest: [7, 15]  [8, 12]  [8, 15]  [8, 18]  [8, 20]
```

stem.root

n	missing	distinct
27	146	5

Value	[b]	[c]	[f]	[r]	[s]
Frequency	9	2	3	4	9
Proportion	0.333	0.074	0.111	0.148	0.333

stem.surface

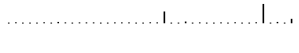


n	missing	distinct
65	108	14

Value	[f]	[g]	[h]	[i, s]	[i, t]	[i, y]	[i]	[k, s]	[k]	[s, h]	[s]	[t]
Frequency	3	5	1	1	1	1	11	1	4	1	15	7
Proportion	0.046	0.077	0.015	0.015	0.015	0.015	0.169	0.015	0.062	0.015	0.231	0.108

Value	[y, s]	[y]
Frequency	1	13
Proportion	0.015	0.200

stem.color



n	missing	distinct
173	0	41

lowest :	[b, u]	[e, n]	[e, u, y]	[e, y]	[e]
highest:	[w]	[y, e, n]	[y, n]	[y, o, k]	[y]

veil.type

n	missing	distinct	value
9	164	1	[u]

Value	[u]
Frequency	9
Proportion	1

veil.color

n	missing	distinct
21	152	7

Value	[e, n]	[k]	[n]	[u]	[w]	[y, w]	[y]
Frequency	1	1	1	1	15	1	1
Proportion	0.048	0.048	0.048	0.048	0.714	0.048	0.048

has.ring

n	missing	distinct
173	0	2

Value	[f]	[t]
Frequency	130	43
Proportion	0.751	0.249

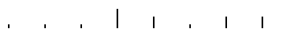
ring.type

n	missing	distinct
166	7	13

Value	[e, g]	[e]	[f]	[g, p]	[g]	[l, e]	[l, p]	[l, r]	[l]	[m]	[p]	[r]
Frequency	1	6	137	2	2	1	1	2	2	1	2	3
Proportion	0.006	0.036	0.825	0.012	0.012	0.006	0.006	0.012	0.012	0.006	0.012	0.018

Value	[z]
Frequency	6
Proportion	0.036

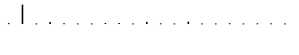
Spore.print.color



n	missing	distinct
18	155	8

Value	[g]	[k, r]	[k, u]	[k]	[n]	[p, w]	[p]	[w]
Frequency	1	1	1	5	3	1	3	3
Proportion	0.056	0.056	0.056	0.278	0.167	0.056	0.167	0.167

habitat



n	missing	distinct
173	0	21

lowest :	[d, h]	[d]	[g, d, h]	[g, d]	[g, h, d]
highest:	[m, d]	[m, h]	[m]	[p, d]	[w]

season

n	missing	distinct
173	0	10

Value	[a, w]	[a]	[s, a, w]	[s, u, a, w]	[s, u, a]	[s, u]
Frequency	15	16	1	13	5	3
Proportion	0.087	0.092	0.006	0.075	0.029	0.017

Value	[s]	[u, a, w]	[u, a]	[u]
Frequency	1	12	106	1
Proportion	0.006	0.069	0.613	0.006

3. Table One

```
library(table1)
library(tidyr)
library(knitr)
library(kableExtra)

vars_to_split <- c("cap.diameter", "stem.height", "stem.width")

for (var in vars_to_split) {
  if (var %in% names(df)) {
    df <- df %>%
      mutate(!!var := gsub("\\[|\\]", "", .data[[var]])) %>%  #
      mutate(!!var := ifelse(grepl(",", .data[[var]]), .data[[var]], paste(.data[[var]], .data[[var]], s
      separate(var, into = c(paste0(var, ".min"), paste0(var, ".max")), sep = ", ", convert = TRUE) %>%
      mutate(!!paste0(var, ".mean") := ifelse(.data[[paste0(var, ".min")]] == .data[[paste0(var, ".max")
                                              .data[[paste0(var, ".min")]], NA)) %>%
      mutate(!!paste0(var, ".max") := ifelse(!is.na(.data[[paste0(var, ".mean")]]), NA, .data[[paste0(va
  }
}

df$class <- as.factor(df$class)

numerical_vars <- c("cap.diameter.min", "cap.diameter.max", "cap.diameter.mean",
                    "stem.height.min", "stem.height.max", "stem.height.mean",
                    "stem.width.min", "stem.width.max", "stem.width.mean")

categorical_vars <- setdiff(names(df), c(numerical_vars, "family", "name"))

df[categorical_vars] <- lapply(df[categorical_vars], as.factor)

df_subset <- df[, c(numerical_vars, categorical_vars), drop = FALSE]

df_subset <- as.data.frame(df_subset)


df_subset[categorical_vars] <- lapply(df_subset[categorical_vars], as.factor)

t1 <- table1(~ . | class, data = df_subset)

kable(t1, format = "latex", booktabs = TRUE, longtable = TRUE) %>%
  kable_styling(latex_options = c("repeat_header"))
```

	e	p	Overall
	(N=77)	(N=96)	(N=173)
cap.diameter.min			
Mean (SD)	4.75 (5.74)	3.47 (2.27)	4.04 (4.22)
Median [Min, Max]	4.00 [0.500, 50.0]	3.00 [0.400, 10.0]	3.00 [0.400, 50.0]
cap.diameter.max			
Mean (SD)	10.3 (5.76)	8.29 (5.58)	9.20 (5.73)
Median [Min, Max]	10.0 [1.50, 30.0]	7.00 [1.00, 30.0]	8.00 [1.00, 30.0]
Missing	1 (1.3%)	0 (0%)	1 (0.6%)
cap.diameter.mean			
Mean (SD)	50.0 (NA)	NA (NA)	50.0 (NA)
Median [Min, Max]	50.0 [50.0, 50.0]	NA [NA, NA]	50.0 [50.0, 50.0]
Missing	76 (98.7%)	96 (100%)	172 (99.4%)
stem.height.min			
Mean (SD)	4.52 (2.20)	4.14 (2.31)	4.31 (2.26)
Median [Min, Max]	4.00 [2.00, 15.0]	4.00 [0, 15.0]	4.00 [0, 15.0]
stem.height.max			
Mean (SD)	9.58 (5.03)	8.57 (3.80)	9.03 (4.41)
Median [Min, Max]	8.00 [3.00, 35.0]	8.00 [2.00, 20.0]	8.00 [2.00, 35.0]
Missing	0 (0%)	3 (3.1%)	3 (1.7%)
stem.height.mean			
Mean (SD)	NA (NA)	0 (0)	0 (0)
Median [Min, Max]	NA [NA, NA]	0 [0, 0]	0 [0, 0]
Missing	77 (100%)	93 (96.9%)	170 (98.3%)
stem.width.min			
Mean (SD)	10.1 (6.80)	7.26 (5.71)	8.53 (6.36)
Median [Min, Max]	10.0 [1.00, 40.0]	5.00 [0, 20.0]	8.00 [0, 40.0]
stem.width.max			
Mean (SD)	19.2 (15.9)	14.4 (11.8)	16.6 (13.9)
Median [Min, Max]	15.0 [2.00, 100]	10.0 [1.00, 60.0]	15.0 [1.00, 100]
Missing	4 (5.2%)	7 (7.3%)	11 (6.4%)
stem.width.mean			
Mean (SD)	7.75 (4.50)	2.00 (3.61)	4.09 (4.72)
Median [Min, Max]	10.0 [1.00, 10.0]	1.00 [0, 10.0]	1.00 [0, 10.0]
Missing	73 (94.8%)	89 (92.7%)	162 (93.6%)
cap.shape			
[b, f, s]	0 (0%)	1 (1.0%)	1 (0.6%)
[b, f]	2 (2.6%)	3 (3.1%)	5 (2.9%)

(continued)

	e	p	Overall
[b, x, f]	0 (0%)	1 (1.0%)	1 (0.6%)
[b, x]	0 (0%)	3 (3.1%)	3 (1.7%)
[b]	2 (2.6%)	8 (8.3%)	10 (5.8%)
[c, f]	0 (0%)	2 (2.1%)	2 (1.2%)
[c, x, f]	1 (1.3%)	0 (0%)	1 (0.6%)
[c, x]	1 (1.3%)	0 (0%)	1 (0.6%)
[c]	1 (1.3%)	2 (2.1%)	3 (1.7%)
[f, s]	3 (3.9%)	5 (5.2%)	8 (4.6%)
[f, x]	1 (1.3%)	1 (1.0%)	2 (1.2%)
[f]	4 (5.2%)	4 (4.2%)	8 (4.6%)
[o]	1 (1.3%)	7 (7.3%)	8 (4.6%)
[p, b]	1 (1.3%)	2 (2.1%)	3 (1.7%)
[p, c, o]	1 (1.3%)	0 (0%)	1 (0.6%)
[p, f]	2 (2.6%)	0 (0%)	2 (1.2%)
[p, x, f]	2 (2.6%)	0 (0%)	2 (1.2%)
[p, x]	3 (3.9%)	1 (1.0%)	4 (2.3%)
[p]	0 (0%)	1 (1.0%)	1 (0.6%)
[s, o]	2 (2.6%)	0 (0%)	2 (1.2%)
[s]	4 (5.2%)	5 (5.2%)	9 (5.2%)
[x, f, s]	7 (9.1%)	6 (6.3%)	13 (7.5%)
[x, f]	14 (18.2%)	15 (15.6%)	29 (16.8%)
[x, o]	0 (0%)	1 (1.0%)	1 (0.6%)
[x, p]	1 (1.3%)	1 (1.0%)	2 (1.2%)
[x, s]	1 (1.3%)	2 (2.1%)	3 (1.7%)
[x]	23 (29.9%)	25 (26.0%)	48 (27.7%)
Cap.surface			
	19 (24.7%)	21 (21.9%)	40 (23.1%)
[d, e, y, i]	0 (0%)	1 (1.0%)	1 (0.6%)
[d, k, s]	0 (0%)	1 (1.0%)	1 (0.6%)
[d, k]	1 (1.3%)	1 (1.0%)	2 (1.2%)
[d, s]	1 (1.3%)	0 (0%)	1 (0.6%)
[d]	4 (5.2%)	5 (5.2%)	9 (5.2%)
[e, k, s, h]	0 (0%)	1 (1.0%)	1 (0.6%)
[e, t, k]	0 (0%)	1 (1.0%)	1 (0.6%)
[e, y]	1 (1.3%)	0 (0%)	1 (0.6%)
[e]	3 (3.9%)	2 (2.1%)	5 (2.9%)
[g, h]	0 (0%)	1 (1.0%)	1 (0.6%)

(continued)

	e	p	Overall
[g, s, d]	0 (0%)	1 (1.0%)	1 (0.6%)
[g, s, h, t]	1 (1.3%)	0 (0%)	1 (0.6%)
[g, s, t]	1 (1.3%)	0 (0%)	1 (0.6%)
[g]	5 (6.5%)	7 (7.3%)	12 (6.9%)
[h, s, d]	1 (1.3%)	0 (0%)	1 (0.6%)
[h, s, t]	0 (0%)	1 (1.0%)	1 (0.6%)
[h, t, w]	0 (0%)	1 (1.0%)	1 (0.6%)
[h, t, y]	0 (0%)	1 (1.0%)	1 (0.6%)
[h, t]	6 (7.8%)	4 (4.2%)	10 (5.8%)
[h]	3 (3.9%)	2 (2.1%)	5 (2.9%)
[i, e]	0 (0%)	1 (1.0%)	1 (0.6%)
[i, y]	2 (2.6%)	0 (0%)	2 (1.2%)
[i]	0 (0%)	4 (4.2%)	4 (2.3%)
[k, e]	0 (0%)	1 (1.0%)	1 (0.6%)
[k]	0 (0%)	4 (4.2%)	4 (2.3%)
[l]	2 (2.6%)	2 (2.1%)	4 (2.3%)
[s, d]	1 (1.3%)	0 (0%)	1 (0.6%)
[s, h]	0 (0%)	1 (1.0%)	1 (0.6%)
[s, i]	0 (0%)	1 (1.0%)	1 (0.6%)
[s, t]	2 (2.6%)	2 (2.1%)	4 (2.3%)
[s, y]	1 (1.3%)	2 (2.1%)	3 (1.7%)
[s]	8 (10.4%)	5 (5.2%)	13 (7.5%)
[t, h, s]	1 (1.3%)	0 (0%)	1 (0.6%)
[t, h]	1 (1.3%)	1 (1.0%)	2 (1.2%)
[t, w, d]	0 (0%)	1 (1.0%)	1 (0.6%)
[t]	2 (2.6%)	10 (10.4%)	12 (6.9%)
[w, t]	1 (1.3%)	0 (0%)	1 (0.6%)
[w]	2 (2.6%)	3 (3.1%)	5 (2.9%)
[y, s]	1 (1.3%)	0 (0%)	1 (0.6%)
[y]	7 (9.1%)	7 (7.3%)	14 (8.1%)
cap.color			
[b, p, e, y]	0 (0%)	1 (1.0%)	1 (0.6%)
[b, u]	1 (1.3%)	0 (0%)	1 (0.6%)
[b]	1 (1.3%)	0 (0%)	1 (0.6%)
[e, n, p, w]	0 (0%)	1 (1.0%)	1 (0.6%)
[e, n, y]	2 (2.6%)	0 (0%)	2 (1.2%)

(continued)

	e	p	Overall
[e, n]	0 (0%)	2 (2.1%)	2 (1.2%)
[e, o, k]	0 (0%)	1 (1.0%)	1 (0.6%)
[e, o]	0 (0%)	1 (1.0%)	1 (0.6%)
[e, p, w]	0 (0%)	1 (1.0%)	1 (0.6%)
[e, u, y]	0 (0%)	1 (1.0%)	1 (0.6%)
[e]	0 (0%)	3 (3.1%)	3 (1.7%)
[g, k]	1 (1.3%)	1 (1.0%)	2 (1.2%)
[g, n, k]	0 (0%)	1 (1.0%)	1 (0.6%)
[g, n]	6 (7.8%)	4 (4.2%)	10 (5.8%)
[g, r, k, n]	0 (0%)	1 (1.0%)	1 (0.6%)
[g, r, n]	0 (0%)	2 (2.1%)	2 (1.2%)
[g, u, n, p]	1 (1.3%)	0 (0%)	1 (0.6%)
[g, u, n]	0 (0%)	1 (1.0%)	1 (0.6%)
[g]	0 (0%)	1 (1.0%)	1 (0.6%)
[k, n, w]	1 (1.3%)	0 (0%)	1 (0.6%)
[l, g, b, w]	1 (1.3%)	0 (0%)	1 (0.6%)
[l, k]	0 (0%)	1 (1.0%)	1 (0.6%)
[l, r, w]	1 (1.3%)	0 (0%)	1 (0.6%)
[l, u, g, n]	1 (1.3%)	0 (0%)	1 (0.6%)
[l, y]	1 (1.3%)	0 (0%)	1 (0.6%)
[n ,w]	1 (1.3%)	0 (0%)	1 (0.6%)
[n, b]	1 (1.3%)	1 (1.0%)	2 (1.2%)
[n, e, y]	0 (0%)	1 (1.0%)	1 (0.6%)
[n, e]	1 (1.3%)	4 (4.2%)	5 (2.9%)
[n, g]	3 (3.9%)	0 (0%)	3 (1.7%)
[n, o, e]	1 (1.3%)	0 (0%)	1 (0.6%)
[n, o, y, w]	0 (0%)	1 (1.0%)	1 (0.6%)
[n, o]	2 (2.6%)	2 (2.1%)	4 (2.3%)
[n, p, e]	1 (1.3%)	1 (1.0%)	2 (1.2%)
[n, r, u, y]	1 (1.3%)	0 (0%)	1 (0.6%)
[n, w]	1 (1.3%)	3 (3.1%)	4 (2.3%)
[n, y, e]	1 (1.3%)	0 (0%)	1 (0.6%)
[n, y, w]	1 (1.3%)	0 (0%)	1 (0.6%)
[n, y]	3 (3.9%)	6 (6.3%)	9 (5.2%)
[n]	22 (28.6%)	16 (16.7%)	38 (22.0%)
[o, b]	1 (1.3%)	0 (0%)	1 (0.6%)

(continued)

	e	p	Overall
[o, e, n, k]	0 (0%)	1 (1.0%)	1 (0.6%)
[o, n]	1 (1.3%)	0 (0%)	1 (0.6%)
[o, p, e]	1 (1.3%)	0 (0%)	1 (0.6%)
[o, y, r]	0 (0%)	1 (1.0%)	1 (0.6%)
[o, y]	0 (0%)	3 (3.1%)	3 (1.7%)
[o]	0 (0%)	2 (2.1%)	2 (1.2%)
[p]	0 (0%)	2 (2.1%)	2 (1.2%)
[r, l]	0 (0%)	1 (1.0%)	1 (0.6%)
[r, n]	0 (0%)	1 (1.0%)	1 (0.6%)
[r, p, y]	0 (0%)	1 (1.0%)	1 (0.6%)
[r, y]	0 (0%)	1 (1.0%)	1 (0.6%)
[r]	0 (0%)	1 (1.0%)	1 (0.6%)
[u, k]	1 (1.3%)	0 (0%)	1 (0.6%)
[u]	0 (0%)	2 (2.1%)	2 (1.2%)
[w, g]	1 (1.3%)	1 (1.0%)	2 (1.2%)
[w, n]	2 (2.6%)	2 (2.1%)	4 (2.3%)
[w, p, o]	1 (1.3%)	0 (0%)	1 (0.6%)
[w, u]	0 (0%)	1 (1.0%)	1 (0.6%)
[w, y, g, n]	0 (0%)	1 (1.0%)	1 (0.6%)
[w, y]	1 (1.3%)	1 (1.0%)	2 (1.2%)
[w]	6 (7.8%)	6 (6.3%)	12 (6.9%)
[y, n]	0 (0%)	3 (3.1%)	3 (1.7%)
[y, o, g, n, r]	0 (0%)	1 (1.0%)	1 (0.6%)
[y, o, r, n]	0 (0%)	1 (1.0%)	1 (0.6%)
[y, o]	0 (0%)	1 (1.0%)	1 (0.6%)
[y]	6 (7.8%)	4 (4.2%)	10 (5.8%)
does.bruise.or.bleed			
[f]	63 (81.8%)	80 (83.3%)	143 (82.7%)
[t]	14 (18.2%)	16 (16.7%)	30 (17.3%)
gill.attachment			
	10 (13.0%)	18 (18.8%)	28 (16.2%)
[a, d]	5 (6.5%)	3 (3.1%)	8 (4.6%)
[a]	11 (14.3%)	21 (21.9%)	32 (18.5%)
[d]	9 (11.7%)	16 (16.7%)	25 (14.5%)
[e]	10 (13.0%)	6 (6.3%)	16 (9.2%)
[f]	4 (5.2%)	6 (6.3%)	10 (5.8%)
[p]	12 (15.6%)	5 (5.2%)	17 (9.8%)

(continued)

	e	p	Overall
[s]	7 (9.1%)	9 (9.4%)	16 (9.2%)
[x]	9 (11.7%)	12 (12.5%)	21 (12.1%)
gill.spacing			
	31 (40.3%)	40 (41.7%)	71 (41.0%)
[c]	29 (37.7%)	41 (42.7%)	70 (40.5%)
[d]	13 (16.9%)	9 (9.4%)	22 (12.7%)
[f]	4 (5.2%)	6 (6.3%)	10 (5.8%)
gill.color			
[b, p, w]	0 (0%)	1 (1.0%)	1 (0.6%)
[b, u]	1 (1.3%)	0 (0%)	1 (0.6%)
[b]	1 (1.3%)	0 (0%)	1 (0.6%)
[e]	0 (0%)	1 (1.0%)	1 (0.6%)
[f]	4 (5.2%)	6 (6.3%)	10 (5.8%)
[g, k]	1 (1.3%)	1 (1.0%)	2 (1.2%)
[g, n, u]	0 (0%)	1 (1.0%)	1 (0.6%)
[g, n]	1 (1.3%)	2 (2.1%)	3 (1.7%)
[g, p]	1 (1.3%)	0 (0%)	1 (0.6%)
[g, r, w]	0 (0%)	1 (1.0%)	1 (0.6%)
[g, u]	0 (0%)	1 (1.0%)	1 (0.6%)
[g, w, y]	1 (1.3%)	0 (0%)	1 (0.6%)
[g, w]	2 (2.6%)	0 (0%)	2 (1.2%)
[g]	3 (3.9%)	1 (1.0%)	4 (2.3%)
[k, n]	2 (2.6%)	4 (4.2%)	6 (3.5%)
[k, p, w]	1 (1.3%)	0 (0%)	1 (0.6%)
[k, p]	0 (0%)	1 (1.0%)	1 (0.6%)
[n, e, y]	0 (0%)	1 (1.0%)	1 (0.6%)
[n, p]	0 (0%)	2 (2.1%)	2 (1.2%)
[n, r]	0 (0%)	1 (1.0%)	1 (0.6%)
[n, u]	0 (0%)	1 (1.0%)	1 (0.6%)
[n, w]	0 (0%)	2 (2.1%)	2 (1.2%)
[n, y]	1 (1.3%)	1 (1.0%)	2 (1.2%)
[n]	3 (3.9%)	8 (8.3%)	11 (6.4%)
[o, b]	1 (1.3%)	0 (0%)	1 (0.6%)
[o, e]	1 (1.3%)	1 (1.0%)	2 (1.2%)
[o, y]	1 (1.3%)	4 (4.2%)	5 (2.9%)
[o]	2 (2.6%)	2 (2.1%)	4 (2.3%)
[p, n, k]	1 (1.3%)	0 (0%)	1 (0.6%)

(continued)

	e	p	Overall
[p, n]	1 (1.3%)	0 (0%)	1 (0.6%)
[p, w]	3 (3.9%)	2 (2.1%)	5 (2.9%)
[p, y, r]	0 (0%)	1 (1.0%)	1 (0.6%)
[p, y]	0 (0%)	1 (1.0%)	1 (0.6%)
[p]	3 (3.9%)	5 (5.2%)	8 (4.6%)
[r, y]	0 (0%)	1 (1.0%)	1 (0.6%)
[r]	1 (1.3%)	0 (0%)	1 (0.6%)
[u, w]	1 (1.3%)	0 (0%)	1 (0.6%)
[w, b, n]	0 (0%)	1 (1.0%)	1 (0.6%)
[w, g, k]	0 (0%)	1 (1.0%)	1 (0.6%)
[w, g, p, n]	0 (0%)	1 (1.0%)	1 (0.6%)
[w, g, u]	0 (0%)	1 (1.0%)	1 (0.6%)
[w, g]	0 (0%)	1 (1.0%)	1 (0.6%)
[w, n]	3 (3.9%)	2 (2.1%)	5 (2.9%)
[w, p, y]	1 (1.3%)	0 (0%)	1 (0.6%)
[w, p]	1 (1.3%)	2 (2.1%)	3 (1.7%)
[w, r]	0 (0%)	1 (1.0%)	1 (0.6%)
[w, u, g, n]	1 (1.3%)	0 (0%)	1 (0.6%)
[w, y, g, n]	0 (0%)	1 (1.0%)	1 (0.6%)
[w, y]	3 (3.9%)	2 (2.1%)	5 (2.9%)
[w]	21 (27.3%)	15 (15.6%)	36 (20.8%)
[y, e, n]	1 (1.3%)	0 (0%)	1 (0.6%)
[y, g, k]	0 (0%)	1 (1.0%)	1 (0.6%)
[y, k]	1 (1.3%)	0 (0%)	1 (0.6%)
[y, n]	1 (1.3%)	4 (4.2%)	5 (2.9%)
[y, o, e]	0 (0%)	1 (1.0%)	1 (0.6%)
[y, r, k]	0 (0%)	1 (1.0%)	1 (0.6%)
[y, r]	1 (1.3%)	0 (0%)	1 (0.6%)
[y, w]	0 (0%)	1 (1.0%)	1 (0.6%)
[y]	6 (7.8%)	7 (7.3%)	13 (7.5%)
stem.root			
	67 (87.0%)	79 (82.3%)	146 (84.4%)
[b]	6 (7.8%)	3 (3.1%)	9 (5.2%)
[c]	0 (0%)	2 (2.1%)	2 (1.2%)
[f]	0 (0%)	3 (3.1%)	3 (1.7%)
[r]	0 (0%)	4 (4.2%)	4 (2.3%)

(continued)

	e	p	Overall
[s]	4 (5.2%)	5 (5.2%)	9 (5.2%)
stem.surface			
	53 (68.8%)	55 (57.3%)	108 (62.4%)
[f]	0 (0%)	3 (3.1%)	3 (1.7%)
[g]	0 (0%)	5 (5.2%)	5 (2.9%)
[h]	0 (0%)	1 (1.0%)	1 (0.6%)
[i, s]	0 (0%)	1 (1.0%)	1 (0.6%)
[i, t]	1 (1.3%)	0 (0%)	1 (0.6%)
[i, y]	0 (0%)	1 (1.0%)	1 (0.6%)
[i]	4 (5.2%)	7 (7.3%)	11 (6.4%)
[k, s]	1 (1.3%)	0 (0%)	1 (0.6%)
[k]	1 (1.3%)	3 (3.1%)	4 (2.3%)
[s, h]	0 (0%)	1 (1.0%)	1 (0.6%)
[s]	9 (11.7%)	6 (6.3%)	15 (8.7%)
[t]	3 (3.9%)	4 (4.2%)	7 (4.0%)
[y, s]	1 (1.3%)	0 (0%)	1 (0.6%)
[y]	4 (5.2%)	9 (9.4%)	13 (7.5%)
stem.color			
[b, u]	1 (1.3%)	0 (0%)	1 (0.6%)
[e, n]	1 (1.3%)	2 (2.1%)	3 (1.7%)
[e, u, y]	0 (0%)	1 (1.0%)	1 (0.6%)
[e, y]	1 (1.3%)	0 (0%)	1 (0.6%)
[e]	0 (0%)	1 (1.0%)	1 (0.6%)
[f]	0 (0%)	3 (3.1%)	3 (1.7%)
[g, w]	1 (1.3%)	0 (0%)	1 (0.6%)
[g, n]	1 (1.3%)	3 (3.1%)	4 (2.3%)
[g, r, n]	0 (0%)	2 (2.1%)	2 (1.2%)
[g, u, n]	0 (0%)	1 (1.0%)	1 (0.6%)
[g, w]	2 (2.6%)	0 (0%)	2 (1.2%)
[g]	2 (2.6%)	0 (0%)	2 (1.2%)
[k, n]	1 (1.3%)	1 (1.0%)	2 (1.2%)
[k]	0 (0%)	1 (1.0%)	1 (0.6%)
[l, r, w]	1 (1.3%)	0 (0%)	1 (0.6%)
[n, e]	0 (0%)	2 (2.1%)	2 (1.2%)
[n, g]	1 (1.3%)	1 (1.0%)	2 (1.2%)
[n, o]	1 (1.3%)	1 (1.0%)	2 (1.2%)
[n, p, w]	1 (1.3%)	0 (0%)	1 (0.6%)

(continued)

	e	p	Overall
[n, p]	0 (0%)	1 (1.0%)	1 (0.6%)
[n, w]	2 (2.6%)	1 (1.0%)	3 (1.7%)
[n, y]	1 (1.3%)	1 (1.0%)	2 (1.2%)
[n]	15 (19.5%)	20 (20.8%)	35 (20.2%)
[o, e]	1 (1.3%)	0 (0%)	1 (0.6%)
[o, n]	1 (1.3%)	0 (0%)	1 (0.6%)
[o, y]	1 (1.3%)	4 (4.2%)	5 (2.9%)
[o]	0 (0%)	1 (1.0%)	1 (0.6%)
[p]	0 (0%)	2 (2.1%)	2 (1.2%)
[r, y]	0 (0%)	1 (1.0%)	1 (0.6%)
[u, e]	0 (0%)	1 (1.0%)	1 (0.6%)
[u]	1 (1.3%)	1 (1.0%)	2 (1.2%)
[w, l, n]	0 (0%)	1 (1.0%)	1 (0.6%)
[w, n]	2 (2.6%)	1 (1.0%)	3 (1.7%)
[w, o]	1 (1.3%)	0 (0%)	1 (0.6%)
[w, u]	0 (0%)	1 (1.0%)	1 (0.6%)
[w, y]	1 (1.3%)	2 (2.1%)	3 (1.7%)
[w]	32 (41.6%)	25 (26.0%)	57 (32.9%)
[y, e, n]	0 (0%)	1 (1.0%)	1 (0.6%)
[y, n]	0 (0%)	4 (4.2%)	4 (2.3%)
[y, o, k]	0 (0%)	1 (1.0%)	1 (0.6%)
[y]	5 (6.5%)	8 (8.3%)	13 (7.5%)
veil.type			
	74 (96.1%)	90 (93.8%)	164 (94.8%)
[u]	3 (3.9%)	6 (6.3%)	9 (5.2%)
veil.color			
	68 (88.3%)	84 (87.5%)	152 (87.9%)
[e, n]	0 (0%)	1 (1.0%)	1 (0.6%)
[k]	0 (0%)	1 (1.0%)	1 (0.6%)
[n]	0 (0%)	1 (1.0%)	1 (0.6%)
[u]	0 (0%)	1 (1.0%)	1 (0.6%)
[w]	7 (9.1%)	8 (8.3%)	15 (8.7%)
[y, w]	1 (1.3%)	0 (0%)	1 (0.6%)
[y]	1 (1.3%)	0 (0%)	1 (0.6%)
has.ring			
[f]	60 (77.9%)	70 (72.9%)	130 (75.1%)
[t]	17 (22.1%)	26 (27.1%)	43 (24.9%)

(continued)

	e	p	Overall
ring.type			
	4 (5.2%)	3 (3.1%)	7 (4.0%)
[e, g]	0 (0%)	1 (1.0%)	1 (0.6%)
[e]	3 (3.9%)	3 (3.1%)	6 (3.5%)
[f]	61 (79.2%)	76 (79.2%)	137 (79.2%)
[g, p]	0 (0%)	2 (2.1%)	2 (1.2%)
[g]	2 (2.6%)	0 (0%)	2 (1.2%)
[l, e]	0 (0%)	1 (1.0%)	1 (0.6%)
[l, p]	1 (1.3%)	0 (0%)	1 (0.6%)
[l, r]	2 (2.6%)	0 (0%)	2 (1.2%)
[l]	1 (1.3%)	1 (1.0%)	2 (1.2%)
[m]	1 (1.3%)	0 (0%)	1 (0.6%)
[p]	1 (1.3%)	1 (1.0%)	2 (1.2%)
[r]	1 (1.3%)	2 (2.1%)	3 (1.7%)
[z]	0 (0%)	6 (6.3%)	6 (3.5%)
Spore.print.color			
	72 (93.5%)	83 (86.5%)	155 (89.6%)
[g]	1 (1.3%)	0 (0%)	1 (0.6%)
[k, r]	0 (0%)	1 (1.0%)	1 (0.6%)
[k, u]	0 (0%)	1 (1.0%)	1 (0.6%)
[k]	1 (1.3%)	4 (4.2%)	5 (2.9%)
[n]	0 (0%)	3 (3.1%)	3 (1.7%)
[p, w]	0 (0%)	1 (1.0%)	1 (0.6%)
[p]	1 (1.3%)	2 (2.1%)	3 (1.7%)
[w]	2 (2.6%)	1 (1.0%)	3 (1.7%)
habitat			
[d, h]	1 (1.3%)	3 (3.1%)	4 (2.3%)
[d]	47 (61.0%)	57 (59.4%)	104 (60.1%)
[g, d, h]	1 (1.3%)	0 (0%)	1 (0.6%)
[g, d]	6 (7.8%)	4 (4.2%)	10 (5.8%)
[g, h, d]	1 (1.3%)	2 (2.1%)	3 (1.7%)
[g, l, d]	0 (0%)	1 (1.0%)	1 (0.6%)
[g, l, m, d]	1 (1.3%)	0 (0%)	1 (0.6%)
[g, m, d]	1 (1.3%)	4 (4.2%)	5 (2.9%)
[g, m]	3 (3.9%)	2 (2.1%)	5 (2.9%)
[g, u, d]	1 (1.3%)	0 (0%)	1 (0.6%)

(continued)

	e	p	Overall
[g]	1 (1.3%)	10 (10.4%)	11 (6.4%)
[h, d]	0 (0%)	2 (2.1%)	2 (1.2%)
[l, d, h]	1 (1.3%)	0 (0%)	1 (0.6%)
[l, d]	7 (9.1%)	6 (6.3%)	13 (7.5%)
[l, h]	1 (1.3%)	0 (0%)	1 (0.6%)
[l]	1 (1.3%)	0 (0%)	1 (0.6%)
[m, d]	2 (2.6%)	1 (1.0%)	3 (1.7%)
[m, h]	0 (0%)	1 (1.0%)	1 (0.6%)
[m]	1 (1.3%)	1 (1.0%)	2 (1.2%)
[p, d]	0 (0%)	2 (2.1%)	2 (1.2%)
[w]	1 (1.3%)	0 (0%)	1 (0.6%)
season			
[a, w]	9 (11.7%)	6 (6.3%)	15 (8.7%)
[a]	5 (6.5%)	11 (11.5%)	16 (9.2%)
[s, a, w]	1 (1.3%)	0 (0%)	1 (0.6%)
[s, u, a, w]	7 (9.1%)	6 (6.3%)	13 (7.5%)
[s, u, a]	1 (1.3%)	4 (4.2%)	5 (2.9%)
[s, u]	2 (2.6%)	1 (1.0%)	3 (1.7%)
[s]	1 (1.3%)	0 (0%)	1 (0.6%)
[u, a, w]	8 (10.4%)	4 (4.2%)	12 (6.9%)
[u, a]	43 (55.8%)	63 (65.6%)	106 (61.3%)
[u]	0 (0%)	1 (1.0%)	1 (0.6%)