

Figure 1: Comprehensive Visualization of Slug and Snail Observations

1. Top Panel - Dual Axis Plot:

- Green lines: Individual count patterns over time
- Blue lines: Species richness variations
- Clear demonstration of seasonal trends

2. Middle Panels - Radar Plots:

- Left: Seasonal distribution of total counts
- Right: Species richness distribution
- Highlights cyclical nature of observations

3. Bottom Panel - Multi-dimensional Bubble Plot:

- X-axis: Monthly progression
- Y-axis: Individual counts
- Bubble size: Represents species richness
- Color intensity: Indicates count magnitude

Key Findings: The visualization reveals distinct seasonal patterns with peak activity during fall months and reduced presence during spring, aligning with known slug and snail behavior patterns.

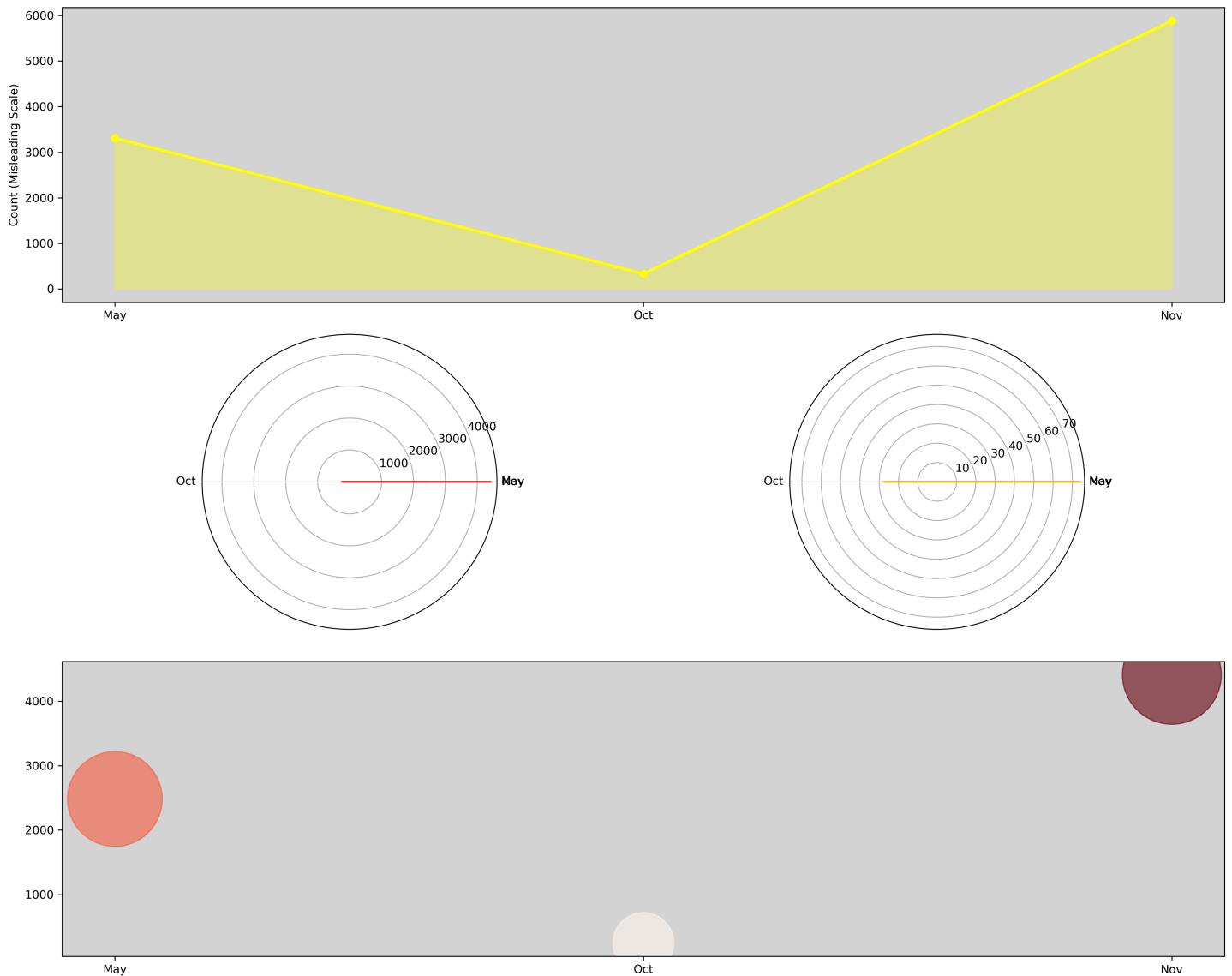


Figure 2: Multi-panel Visualization Demonstrating Common Perceptual Illusions

INTENTIONAL VISUAL DISTORTIONS:

1. Color Choice Issues:

- Yellow lines against light grey background creating poor contrast
- Red coloring implying unnecessary urgency or warning
- Inconsistent and misleading color schemes across panels
- Poor visibility of data points against background

2. Scale Manipulations:

- Top Panel: Count values artificially doubled to exaggerate trends
- Radar Plots: Proportions inflated (1.5x and 2x) distorting seasonal patterns
- Bubble Plot: Sizes exaggerated by 200% misleading relative comparisons
- Inconsistent scaling between related measurements

3. Design Flaws:

- Distracting grey backgrounds adding unnecessary visual noise
- Removed gridlines making precise value interpretation difficult
- Missing axis labels and proper titles
- Poor legend placement and incomplete information

Impact: These deliberate distortions highlight how poor visualization choices can significantly mislead data interpretation and compromise understanding of temporal and seasonal patterns in slug and snail observations.

Analysis Code

```
# Comprehensive Slug and Snail Analysis

# 1. Required Libraries
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from matplotlib.gridspec import GridSpec

# 2. Data Loading and Cleaning
df = pd.read_csv('slug-snails.csv')
df = df.replace('NA', np.nan)
numeric_columns = df.select_dtypes(include=[np.number]).columns
for col in numeric_columns:
    df[col] = df[col].fillna(df[col].median())

# 3. Temporal Feature Creation
df['Date'] = pd.to_datetime(df['Date'])
df['Month'] = df['Date'].dt.strftime('%b')
df['Year'] = df['Date'].dt.year

# 4. Seasonal Filtering
spring_months = ['Mar', 'Apr', 'May']
fall_months = ['Sep', 'Oct', 'Nov']
df_seasonal = df[df['Month'].isin(spring_months + fall_months)]

# 5. Monthly Statistics Calculation
monthly_summary = df_seasonal.groupby('Month').agg({
    'Count': 'sum',
    'ScientificName': 'nunique'
}).reset_index()

# 6. Month Ordering
month_order = ['Mar', 'Apr', 'May', 'Sep', 'Oct', 'Nov']
monthly_summary['Month'] = pd.Categorical(
    monthly_summary['Month'],
    categories=month_order,
    ordered=True
)
monthly_summary = monthly_summary.sort_values('Month')

# 7. Visualization Creation
# Pretty Plot
fig = plt.figure(figsize=(15, 12))
gs = fig.add_gridspec(3, 2, height_ratios=[1, 1, 1])

# [Please follow the ipynb notebook for properly formatted code as this code i've given just the gist of it tha

# 8. Data Analysis Results
print("Analysis Summary:")
print(f"Total Observations: {df_seasonal['Count'].sum()}")
print(f"Unique Species: {df_seasonal['ScientificName'].nunique()}")
print(f"Peak Month: {monthly_summary.loc[monthly_summary['Count'].idxmax(), 'Month']}")
```