

Corbin Carroll vs Ketel Marte (Statcast / StatAPI)

Author: Bowen Li

Objective

This analysis compares **Corbin Carroll** and **Ketel Marte** using pitch-level Statcast data.

Key questions - How do their **plate appearance outcomes** differ? - How do their **home-run contact profiles** (launch speed × launch angle) compare? - Do they generate home runs from **similar pitch velocities and locations**?

Setup

```
library(dplyr)
```

```
##  
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':  
##  
##   filter, lag
```

```
## The following objects are masked from 'package:base':  
##  
##   intersect, setdiff, setequal, union
```

```
library(ggplot2)  
library(patchwork)  
library(tidyr)  
library(viridis)
```

```
## Loading required package: viridisLite
```

Data Loading & Initial Inspection

Each row represents one pitch thrown to the batter.

```
Corbin <- read.csv("Corbin_Carroll_plays_2023_2025.csv")  
Ketel  <- read.csv("Ketel_Marte_plays_2023_2025.csv")  
head(Ketel, 5)
```

```
## season gamePk inning halfInning atBatIndex startTime
## 1 2023 718770 1 top 1 2023-03-31T02:12:11.804Z
## 2 2023 718770 3 top 17 2023-03-31T02:39:31.972Z
## 3 2023 718770 6 top 43 2023-03-31T03:36:58.610Z
## 4 2023 718770 9 top 68 2023-03-31T04:42:58.999Z
## 5 2023 718765 1 top 1 2023-04-01T02:12:26.287Z
##
## endTime homeScore awayScore batter_id batter_name pitcher_id
## 1 2023-03-31T02:12:44.608Z NA NA 606466 Ketel Marte 628711
## 2 2023-03-31T02:39:47.386Z NA NA 606466 Ketel Marte 628711
## 3 2023-03-31T03:40:33.313Z NA NA 606466 Ketel Marte 628711
## 4 2023-03-31T04:44:33.952Z NA NA 606466 Ketel Marte 622075
## 5 2023-04-01T02:13:26.187Z NA NA 606466 Ketel Marte 669160
##
## pitcher_name bat_side pitch_hand event eventType
## 1 Julio Urías R L Hit By Pitch hit_by_pitch
## 2 Julio Urías R L Field Error field_error
## 3 Julio Urías R L Single single
## 4 Yency Almonte L R Flyout field_out
## 5 Dustin May L R Flyout field_out
##
description
## 1
Ketel Marte hit by pitch.
## 2
Ketel Marte reaches on a fielding error by shortstop Miguel Rojas.
## 3 Ketel Marte singles on a line drive to right fielder Mookie Betts. Ketel Marte o
ut at 2nd on the throw, right fielder Mookie Betts to shortstop Miguel Rojas.
## 4
Ketel Marte flies out to left fielder David Peralta.
## 5
Ketel Marte flies out to center fielder James Outman.
## rbi runs_scored_on_play balls strikes outs pitch_number_last pitch_type_last
## 1 0 0 2 0 1 2 FF
## 2 0 0 0 0 1 1 SV
## 3 0 0 3 2 2 10 FF
## 4 0 0 3 2 2 6 ST
## 5 0 0 1 2 2 4 ST
##
start_speed_last spin_rate_last spin_direction_last plate_x_last plate_z_last
## 1 92.8 2485 165 -0.89905488 3.757223
## 2 78.6 2887 309 -0.19216491 2.488158
## 3 92.7 2483 136 0.74860834 2.470186
## 4 82.9 2473 68 0.03506298 1.859603
## 5 87.0 3395 45 -0.57763128 2.285140
##
zone_last launch_speed launch_angle hc_x hc_y
## 1 11 NA NA NA NA
## 2 5 98.7 8 NA NA
## 3 6 90.9 8 NA NA
## 4 8 85.4 58 NA NA
## 5 7 95.0 27 NA NA
```

Plate Appearance Outcome Comparison

The tables below summarize counts and percentages of events for each player between 2023 to 2025 season.

Corbin Carroll

```
Corbin %>%
  count(event, sort = TRUE) %>%
  mutate(pct = round(n / sum(n) * 100, 2))
```

##	event	n	pct
## 1	Strikeout	407	20.37
## 2	Groundout	342	17.12
## 3	Single	246	12.31
## 4	Flyout	228	11.41
## 5	Walk	193	9.66
## 6	Pop Out	128	6.41
## 7	Lineout	97	4.85
## 8	Double	84	4.20
## 9	Home Run	78	3.90
## 10	Forceout	45	2.25
## 11	Triple	42	2.10
## 12	Hit By Pitch	30	1.50
## 13	Sac Fly	17	0.85
## 14	Grounded Into DP	16	0.80
## 15	Sac Bunt	9	0.45
## 16	Field Error	7	0.35
## 17	Caught Stealing 2B	6	0.30
## 18	Fielders Choice	6	0.30
## 19	Double Play	5	0.25
## 20	Intent Walk	5	0.25
## 21	Bunt Groundout	2	0.10
## 22	Bunt Pop Out	1	0.05
## 23	Caught Stealing 3B	1	0.05
## 24	Fielders Choice Out	1	0.05
## 25	Pickoff Caught Stealing 2B	1	0.05
## 26	Strikeout Double Play	1	0.05

Ketel Marte

```
Ketel %>%
  count(event, sort = TRUE) %>%
  mutate(pct = round(n / sum(n) * 100, 2))
```

##		event	n	pct
## 1		Groundout	357	19.75
## 2		Strikeout	300	16.59
## 3		Single	263	14.55
## 4		Flyout	219	12.11
## 5		Walk	188	10.40
## 6		Home Run	91	5.03
## 7		Pop Out	84	4.65
## 8		Lineout	78	4.31
## 9		Double	77	4.26
## 10		Grounded Into DP	39	2.16
## 11		Forceout	27	1.49
## 12		Hit By Pitch	19	1.05
## 13		Sac Fly	18	1.00
## 14		Intent Walk	15	0.83
## 15		Triple	11	0.61
## 16		Field Error	8	0.44
## 17		Fielders Choice Out	5	0.28
## 18		Fielders Choice	4	0.22
## 19		Double Play	2	0.11
## 20		Strikeout Double Play	2	0.11
## 21		Caught Stealing Home	1	0.06

Launch Speed × Launch Angle Profile — Home Runs

```
Corbin_HR <- Corbin %>% filter(event == "Home Run")
Ketel_HR <- Ketel %>% filter(event == "Home Run")
```

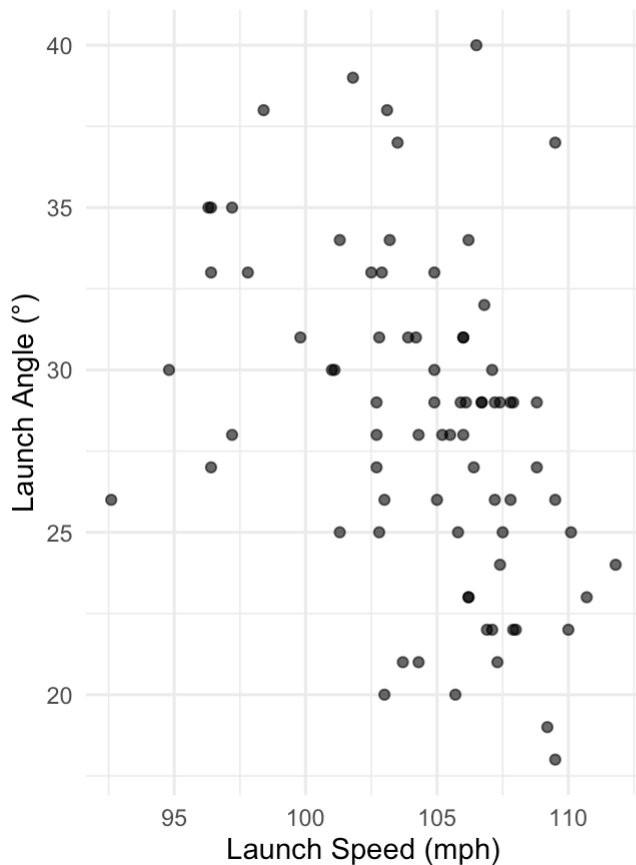
Scatterplots (Raw Outcomes)

```
p1 <- ggplot(Corbin_HR, aes(launch_speed, launch_angle)) +
  geom_point(alpha = 0.65) +
  labs(
    title = "Corbin Carroll — Home Runs",
    x = "Launch Speed (mph)",
    y = "Launch Angle (°)"
  ) +
  theme_minimal()

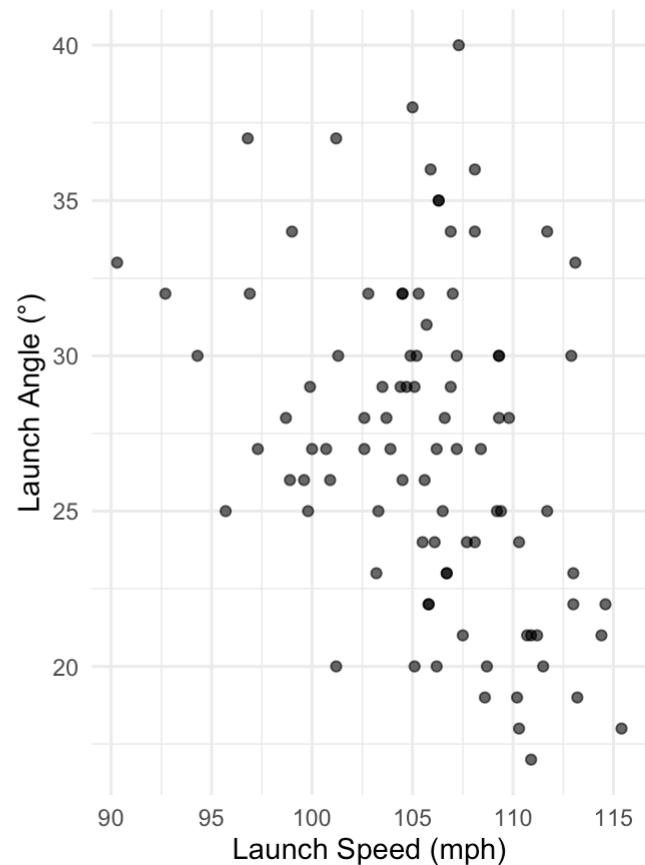
p2 <- ggplot(Ketel_HR, aes(launch_speed, launch_angle)) +
  geom_point(alpha = 0.65) +
  labs(
    title = "Ketel Marte — Home Runs",
    x = "Launch Speed (mph)",
    y = "Launch Angle (°)"
  ) +
  theme_minimal()

p1 + p2
```

Corbin Carroll — Home Runs



Ketel Marte — Home Runs

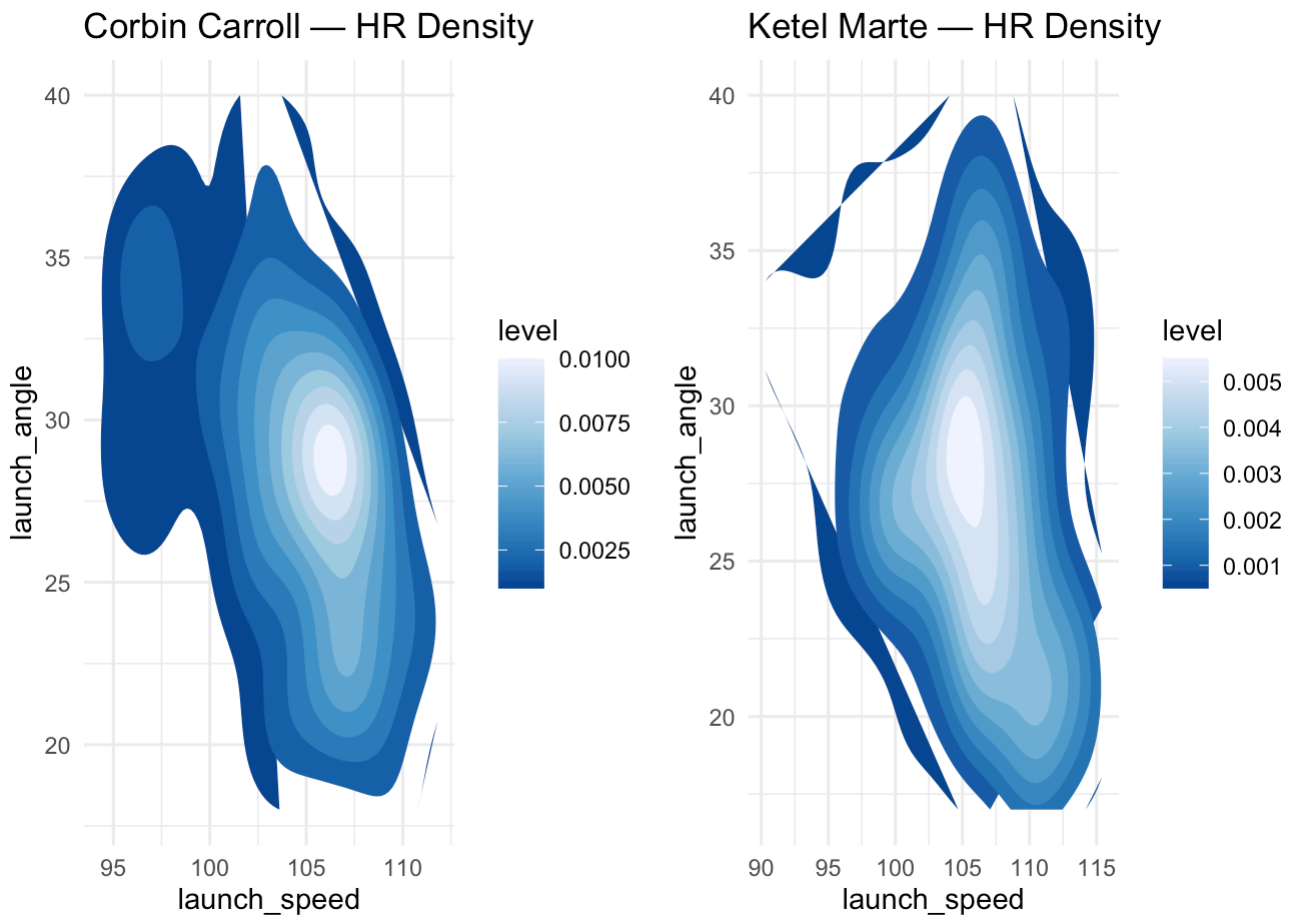


Density

```
p3 <- ggplot(Corbin_HR, aes(launch_speed, launch_angle)) +
  stat_density_2d(
    aes(fill = after_stat(level)),
    geom = "polygon"
  ) +
  scale_fill_distiller(palette = "Blues") +
  labs(title = "Corbin Carroll – HR Density") +
  theme_minimal()
```

```
p4 <- ggplot(Ketel_HR, aes(launch_speed, launch_angle)) +
  stat_density_2d(
    aes(fill = after_stat(level)),
    geom = "polygon"
  ) +
  scale_fill_distiller(palette = "Blues") +
  labs(title = "Ketel Marte – HR Density") +
  theme_minimal()
```

```
p3 + p4
```



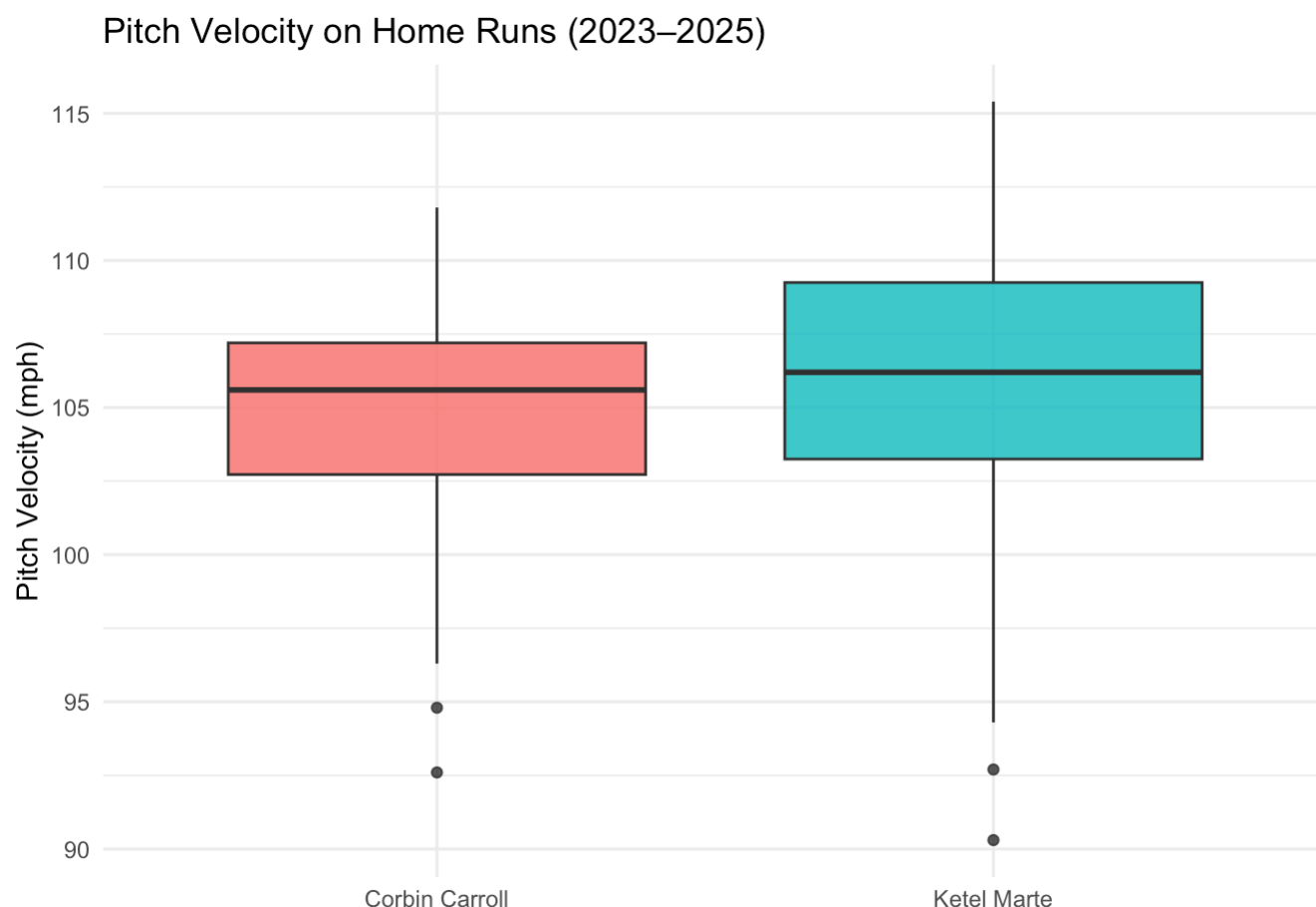
Interpretation:

- Both hitters peak around ~105 mph exit velocity and ~27–29° launch angle.
- Carroll: very tight density → repeatable, efficient HR window.
- Marte: broader density → HRs across wider speeds and angles.
- Implication: Carroll = consistent, stable power; Marte = flexible, higher-variance power.

Pitch Velocity on Home Runs

```
Corbin_Ketel_HR <- bind_rows(
  Corbin_HR %>% mutate(player = "Corbin Carroll"),
  Ketel_HR %>% mutate(player = "Ketel Marte")
)

ggplot(Corbin_Ketel_HR,
  aes(player, launch_speed, fill = player)) +
  geom_boxplot(alpha = 0.85) +
  labs(
    title = "Pitch Velocity on Home Runs (2023–2025)",
    x = "",
    y = "Pitch Velocity (mph)"
  ) +
  theme_minimal() +
  theme(legend.position = "none")
```



Interpretation:

Both hitters homer primarily off hard pitches, with median pitch velocities clustered around 105–106 mph.

- Carroll's distribution is slightly tighter, indicating his home runs tend to come from a more consistent pitch-speed band.
- Marte's distribution is wider, with both higher and lower extremes, showing he can convert a broader range of pitch velocities into home runs.

Overall, Carroll's power looks more speed-specific and consistent, while Marte's is more flexible but higher-variance.

Home Run Pitch Location (Strike Zone)

Color = launch speed, Size = launch angle

```

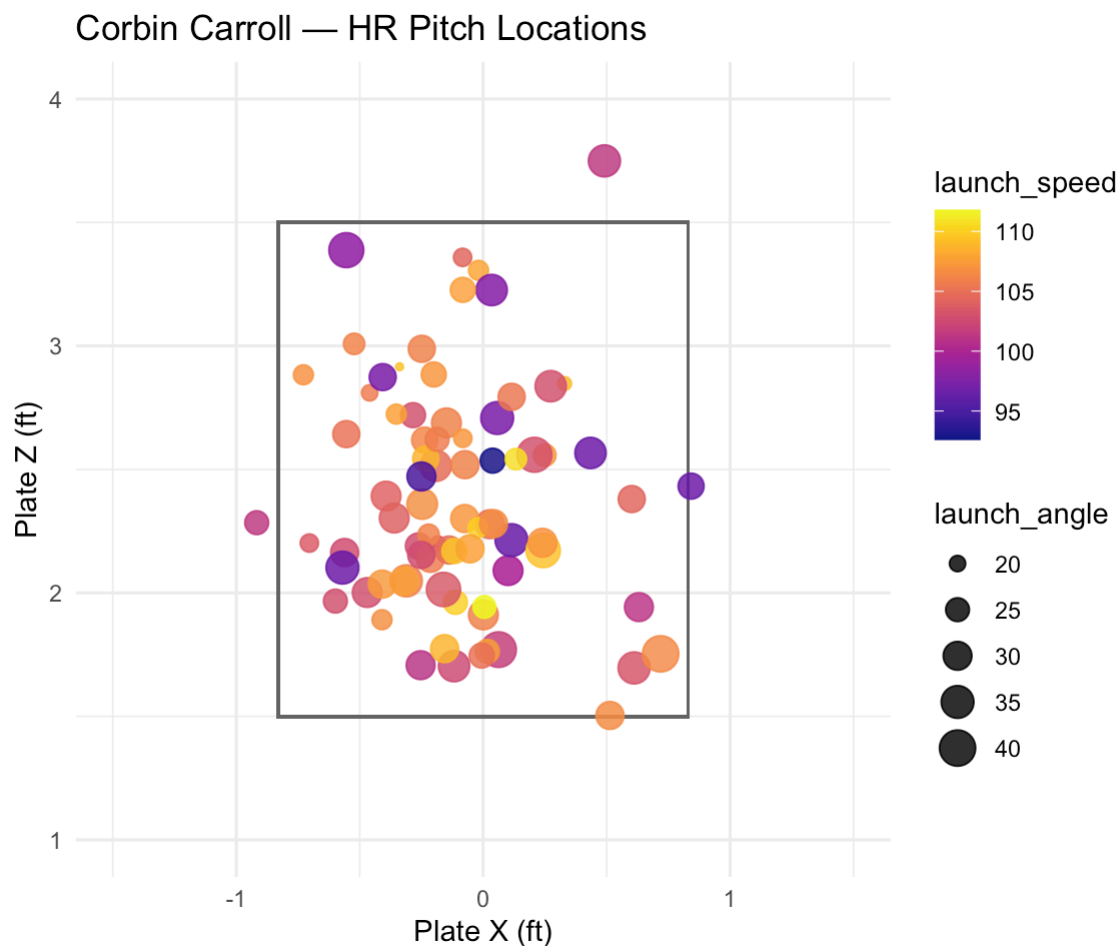
plot_hr_zone <- function(df, title) {

  d <- df %>%
    filter(eventType == "home_run") %>%
    transmute(
      plate_x = plate_x_last,
      plate_z = plate_z_last,
      launch_speed = launch_speed,
      launch_angle = launch_angle
    ) %>%
    filter(is.finite(plate_x), is.finite(plate_z))

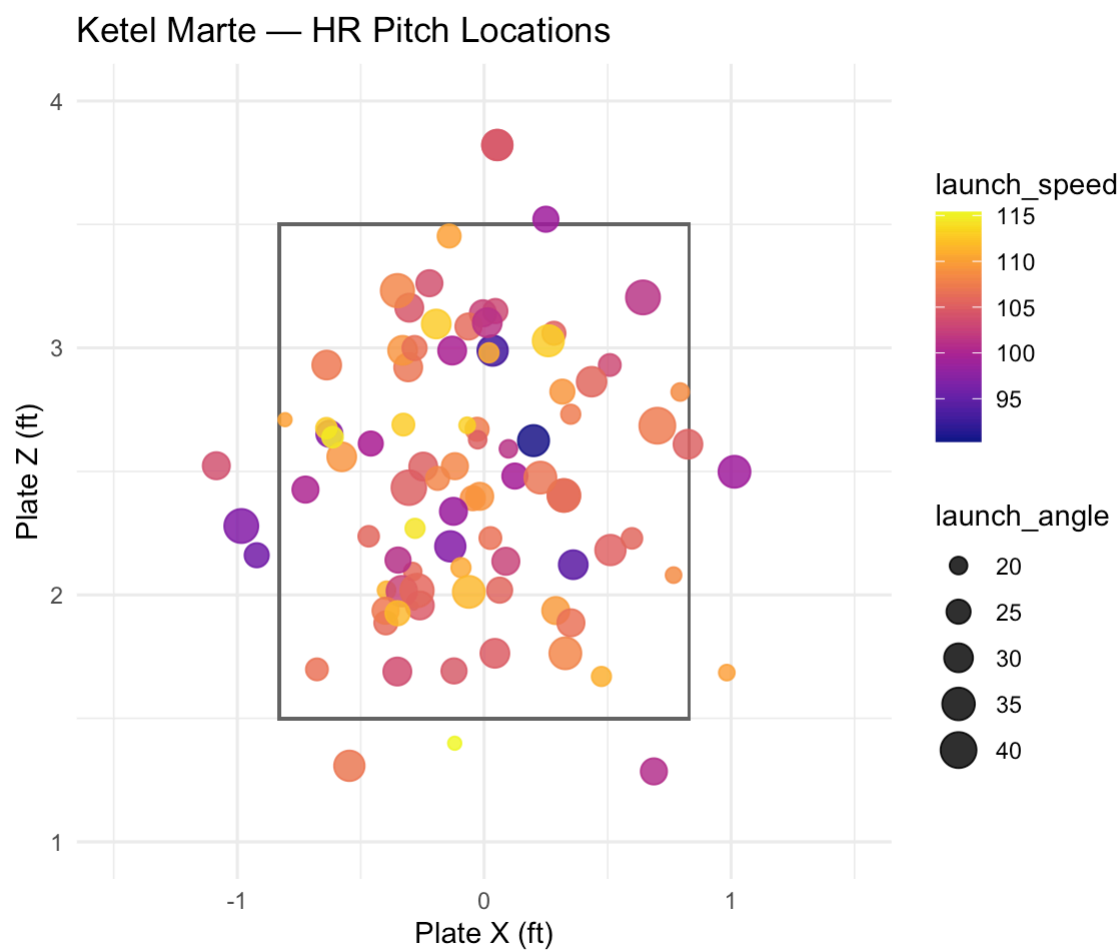
  ggplot(d, aes(plate_x, plate_z)) +
    geom_rect(
      xmin = -0.83, xmax = 0.83,
      ymin = 1.5, ymax = 3.5,
      fill = NA, color = "grey40"
    ) +
    geom_point(aes(color = launch_speed, size = launch_angle),
      alpha = 0.85) +
    scale_color_viridis(option = "C") +
    coord_equal(xlim = c(-1.5, 1.5), ylim = c(1, 4)) +
    labs(title = title, x = "Plate X (ft)", y = "Plate Z (ft)") +
    theme_minimal()
}

plot_hr_zone(Corbin_HR, "Corbin Carroll – HR Pitch Locations")

```




```
plot_hr_zone(Ketel_HR, "Ketel Marte – HR Pitch Locations")
```



```
bind_rows(
  Corbin_HR %>% mutate(player = "Corbin Carroll"),
  Ketel_HR %>% mutate(player = "Ketel Marte")
) %>%
  group_by(player) %>%
  summarise(
    HRs = n(),
    avg_launch_speed = mean(launch_speed, na.rm = TRUE),
    sd_launch_speed = sd(launch_speed, na.rm = TRUE),
    avg_launch_angle = mean(launch_angle, na.rm = TRUE),
    sd_launch_angle = sd(launch_angle, na.rm = TRUE),
    .groups = "drop"
  )
```

```
## # A tibble: 2 × 6
##   player  HRs avg_launch_speed sd_launch_speed avg_launch_angle sd_launch_angle
##   <chr> <int>         <dbl>         <dbl>         <dbl>         <dbl>
## 1 Corbi...   78          105.          4.04          28.4          4.99
## 2 Ketel...   91          106.          5.00          27.1          5.23
```

These visualizations compare home-run pitch locations and batted-ball characteristics for Corbin Carroll and Ketel Marte. Color reflects launch speed, point size reflects launch angle, and the strike zone provides spatial context.

- Carroll's home runs are vertically concentrated, primarily in the middle–lower portion of the strike zone (roughly 1.8–2.5 ft). He does limited damage on the extreme edges of the zone and shows a slight inside bias consistent with pull-side lift as a left-handed hitter. Overall, his power comes from selective, precise contact in a narrow set of hittable locations.
- Marte's home runs are more spatially dispersed. He covers a wider horizontal range of the plate and produces more home runs on pitches higher in the zone (around 2.8–3.4 ft). This indicates a larger damage zone, allowing him to punish a broader range of pitch locations.
- In terms of batted-ball quality, Marte has a slightly higher average exit velocity and a larger total number of home runs, reflecting greater raw power. Carroll shows lower variability in both exit velocity and launch angle, indicating more consistent contact quality. Both hitters operate near optimal home-run launch angles.

Taken together, Carroll fits an efficiency-driven power profile built on repeatable mechanics and tight pitch selection, while Marte profiles as a more versatile power threat who can generate damage across more pitch heights and locations. From a strategic standpoint, Carroll is more sensitive to pitch location, whereas Marte is harder to neutralize without relying on pitch mix and sequencing in addition to location.

3×3 Strike-Zone HR Distribution

Because Corbin Carroll's HR pitch locations appeared **concentrated in the lower-to-middle portion** of the strike zone, a 3×3 grid was introduced to **quantify zone-level differences** and enable a clearer comparison with Ketel Marte.

```

plot_hr_zone_3x3 <- function(df, title) {

  d <- df %>%
    filter(eventType == "home_run") %>%
    transmute(plate_x = plate_x_last, plate_z = plate_z_last) %>%
    filter(is.finite(plate_x), is.finite(plate_z))

  zl <- -0.83; zr <- 0.83; zb <- 1.5; zt <- 3.5
  x1 <- zl + (zr - zl) / 3; x2 <- zl + 2 * (zr - zl) / 3
  z1 <- zb + (zt - zb) / 3; z2 <- zb + 2 * (zt - zb) / 3

  d <- d %>%
    mutate(
      col = case_when(plate_x < x1 ~ 1L, plate_x < x2 ~ 2L, TRUE ~ 3L),
      row = case_when(plate_z < z1 ~ 1L, plate_z < z2 ~ 2L, TRUE ~ 3L),
      zone = (row - 1) * 3 + col
    )

  counts <- d %>% count(zone)

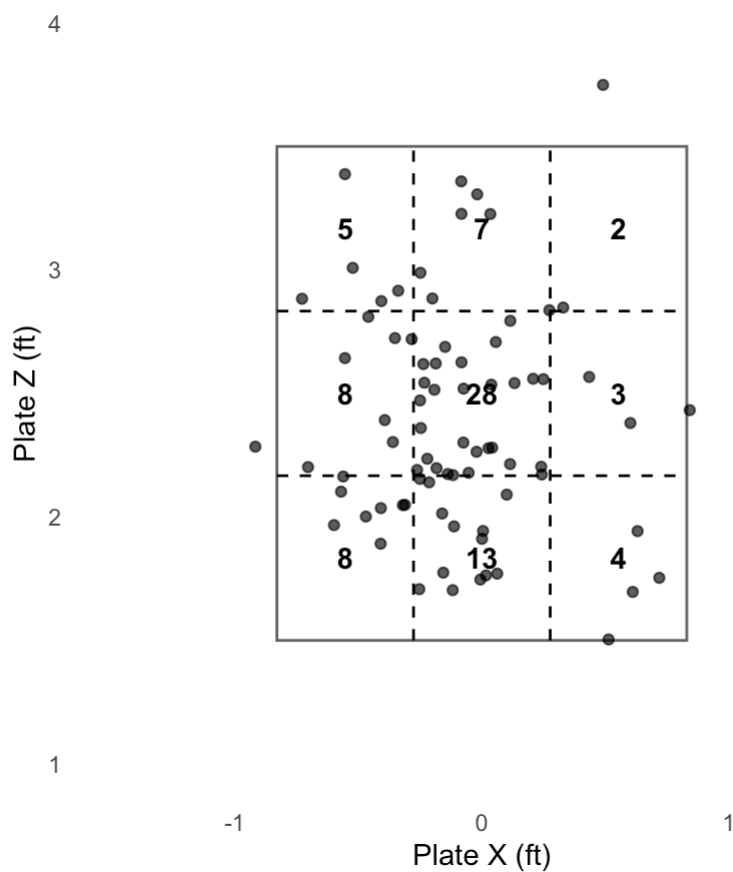
  centers <- expand_grid(row = 1:3, col = 1:3) %>%
    mutate(
      zone = (row - 1) * 3 + col,
      x = zl + (col - 0.5) * (zr - zl) / 3,
      y = zb + (row - 0.5) * (zt - zb) / 3
    ) %>%
    left_join(counts, by = "zone") %>%
    mutate(n = if_else(is.na(n), 0L, n))

  ggplot(d, aes(plate_x, plate_z)) +
    annotate("rect", xmin = zl, xmax = zr, ymin = zb, ymax = zt,
      fill = NA, color = "grey40") +
    annotate("segment", x = x1, xend = x1, y = zb, yend = zt, linetype = "dashed") +
    annotate("segment", x = x2, xend = x2, y = zb, yend = zt, linetype = "dashed") +
    annotate("segment", x = zl, xend = zr, y = z1, yend = z1, linetype = "dashed") +
    annotate("segment", x = zl, xend = zr, y = z2, yend = z2, linetype = "dashed") +
    geom_point(alpha = 0.7) +
    geom_text(data = centers, aes(x, y, label = n),
      inherit.aes = FALSE, fontface = "bold") +
    coord_equal(xlim = c(-1.5, 1.5), ylim = c(1, 4)) +
    labs(title = title, x = "Plate X (ft)", y = "Plate Z (ft)") +
    theme_minimal() +
    theme(panel.grid = element_blank())
}

plot_hr_zone_3x3(Corbin_HR, "Corbin Carroll - HRs by 3x3 Zone")

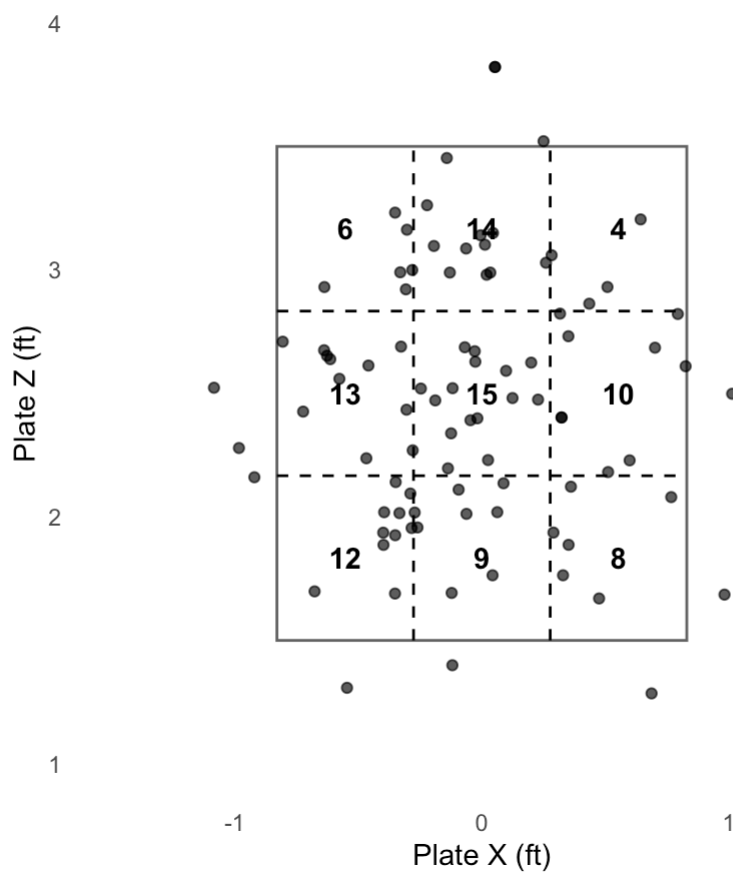
```

Corbin Carroll — HRs by 3×3 Zone



```
plot_hr_zone_3x3(Ketel_HR, "Ketel Marte – HRs by 3×3 Zone")
```

Ketel Marte — HRs by 3×3 Zone



Corbin Carroll — 3×3 HR Distribution

- Carroll's home runs are heavily concentrated in the center of the strike zone. The middle-middle zone accounts for the largest share (28 HRs), with the lower-middle zone as a clear secondary area (13 HRs). Very little damage comes from the upper or outer parts of the zone, with almost no production up and away. Overall, his home runs cluster vertically in the middle-lower region, with limited reach to the edges.
- This pattern suggests that Carroll's power is highly localized. He does most of his damage on pitches left in the heart of the zone, especially middle-down, consistent with a precision-driven profile built on optimized swing mechanics and selective pitch damage.

Ketel Marte — 3×3 HR Distribution

- Marte's home runs are distributed more evenly across the strike zone. While the middle-middle zone remains the most productive, substantial damage also appears in the middle-inside and middle-outside zones, with additional power showing up both higher and lower in the zone.
- This distribution indicates a broader damage zone both horizontally and vertically. Marte is able to lift pitches on the inner and outer halves as well as in the middle, making his power less dependent on a single mistake location.

Overall, the 3×3 breakdown reinforces that Carroll's power is concentrated in the middle-lower strike zone, reflecting an efficiency-driven and location-sensitive profile, whereas Marte produces home runs from a wider range of pitch locations, making him a more location-resistant power threat.

Baseball & R&D Implications

Pitching Strategy

- Vs Carroll
 - Avoid middle-down misses.
 - Expanding vertically (especially up) reduces HR risk.
- Vs Marte
 - Location alone is insufficient.
 - Must rely on pitch mix, movement, and sequencing.

Player Evaluation

- Carroll:
 - Predictable, repeatable HR profile
 - Easier to model and game-plan against
- Marte:
 - Higher defensive and pitching complexity
 - Harder to neutralize due to spatial flexibility