National Methods Comparison for Mongolia

10-12 September, 2008

Mongolian Society of Range Management

with

Institute of Botany

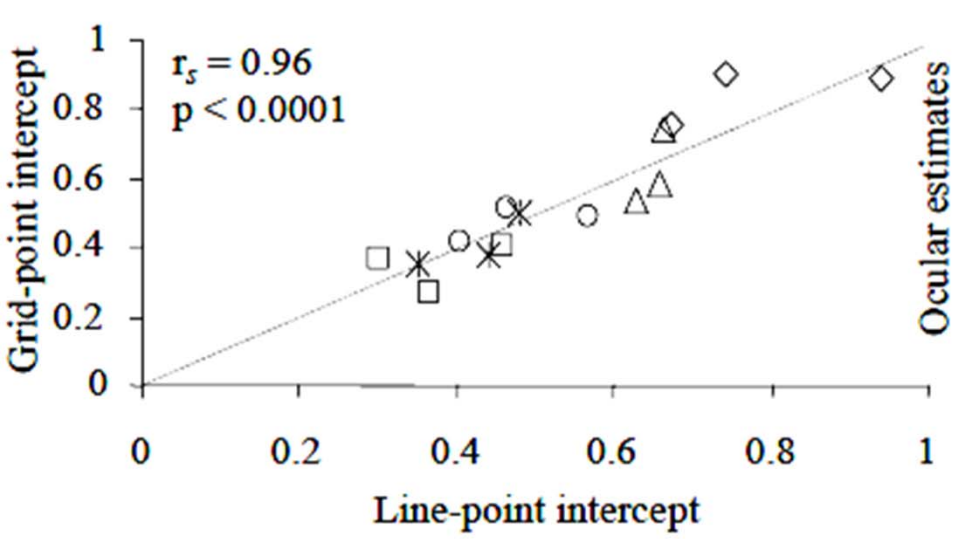
RIAH

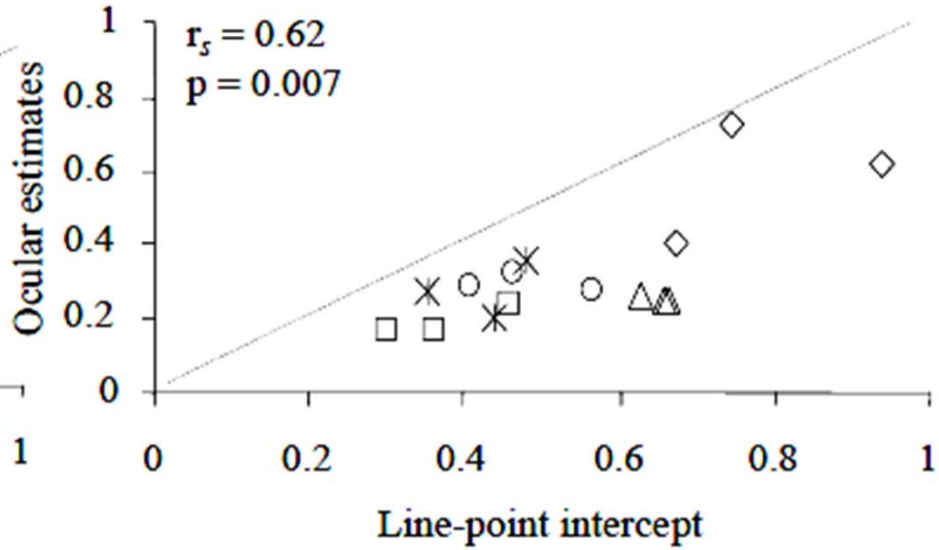
Meteorology Institute

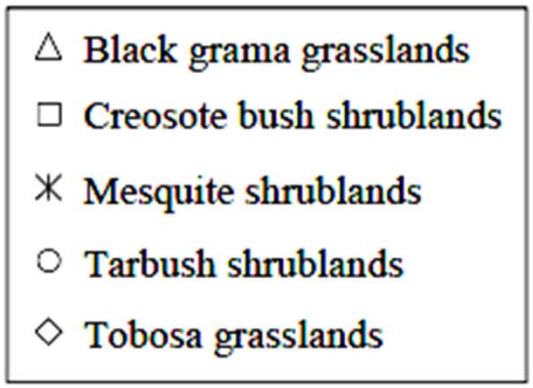
USDA-ARS Jornada

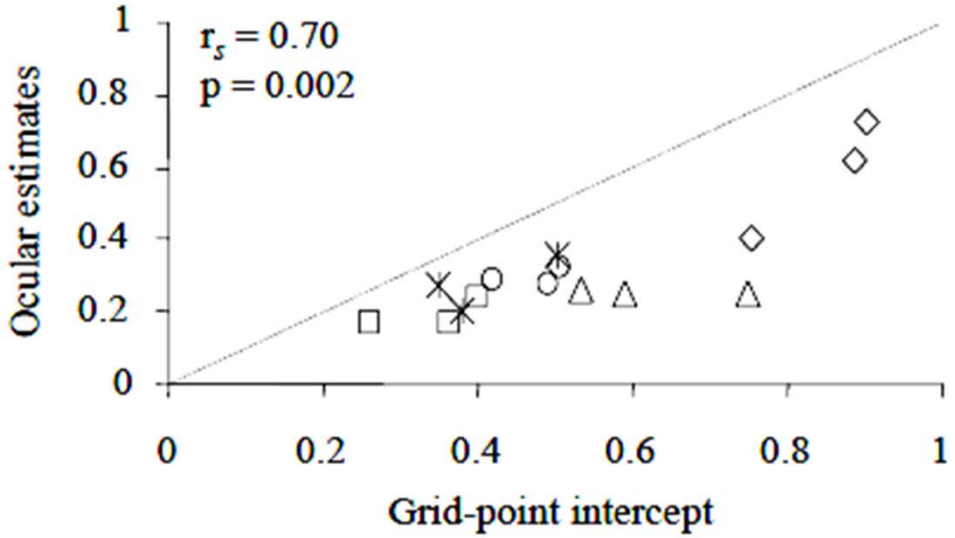
(Gobi Forage/Mercy Corps)

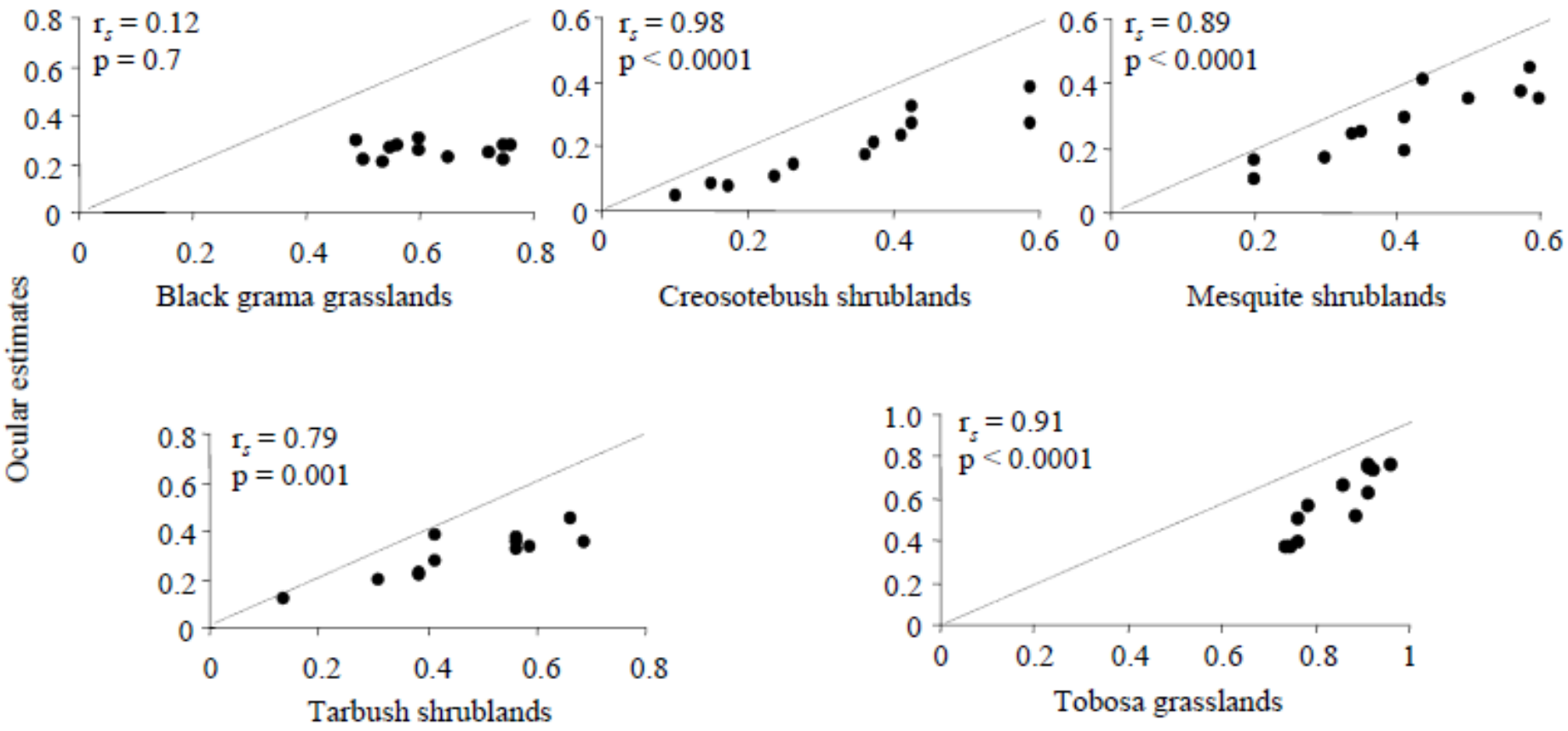
Conclusion: point-based methods using a **pin** are highly correlated and are not correlated with ocular estimates.





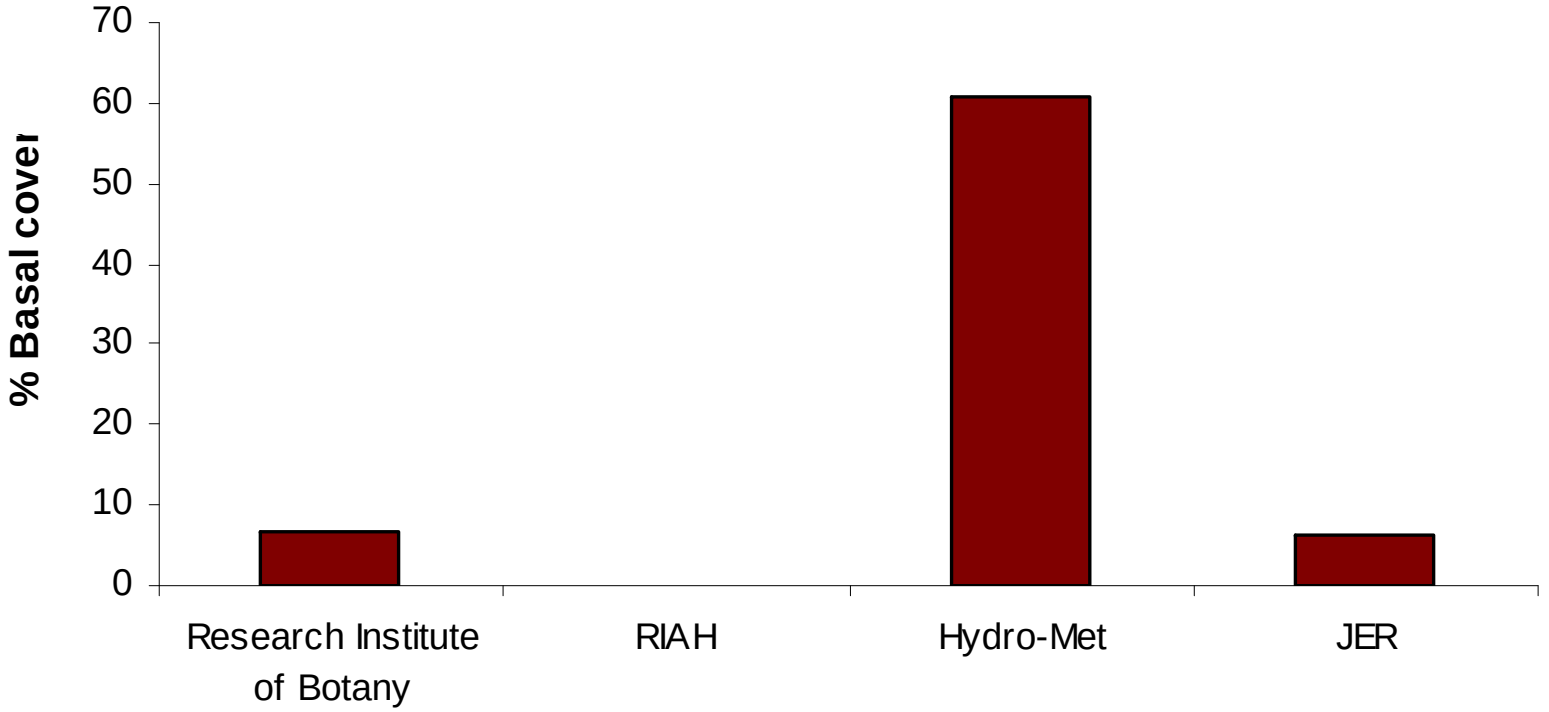


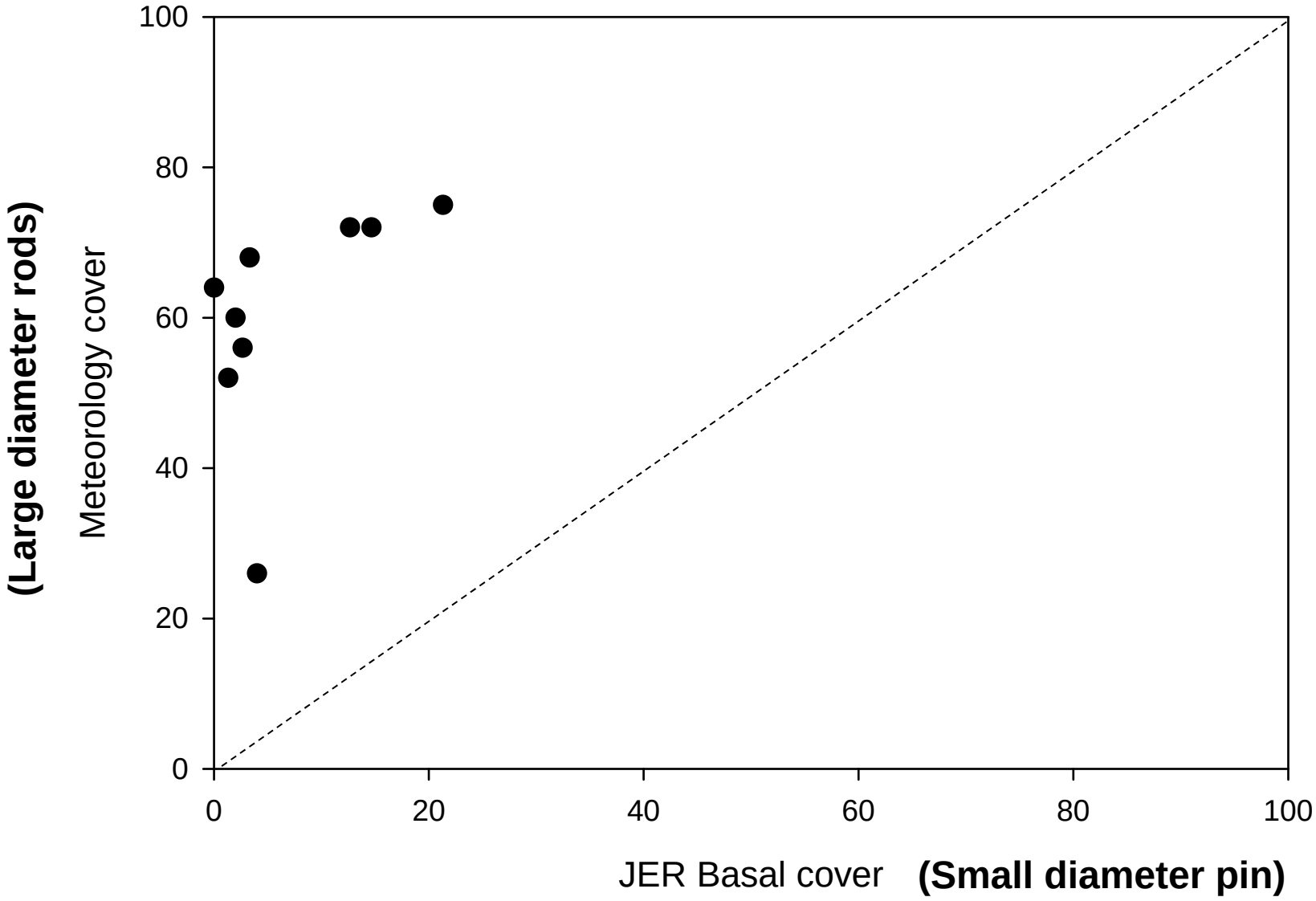


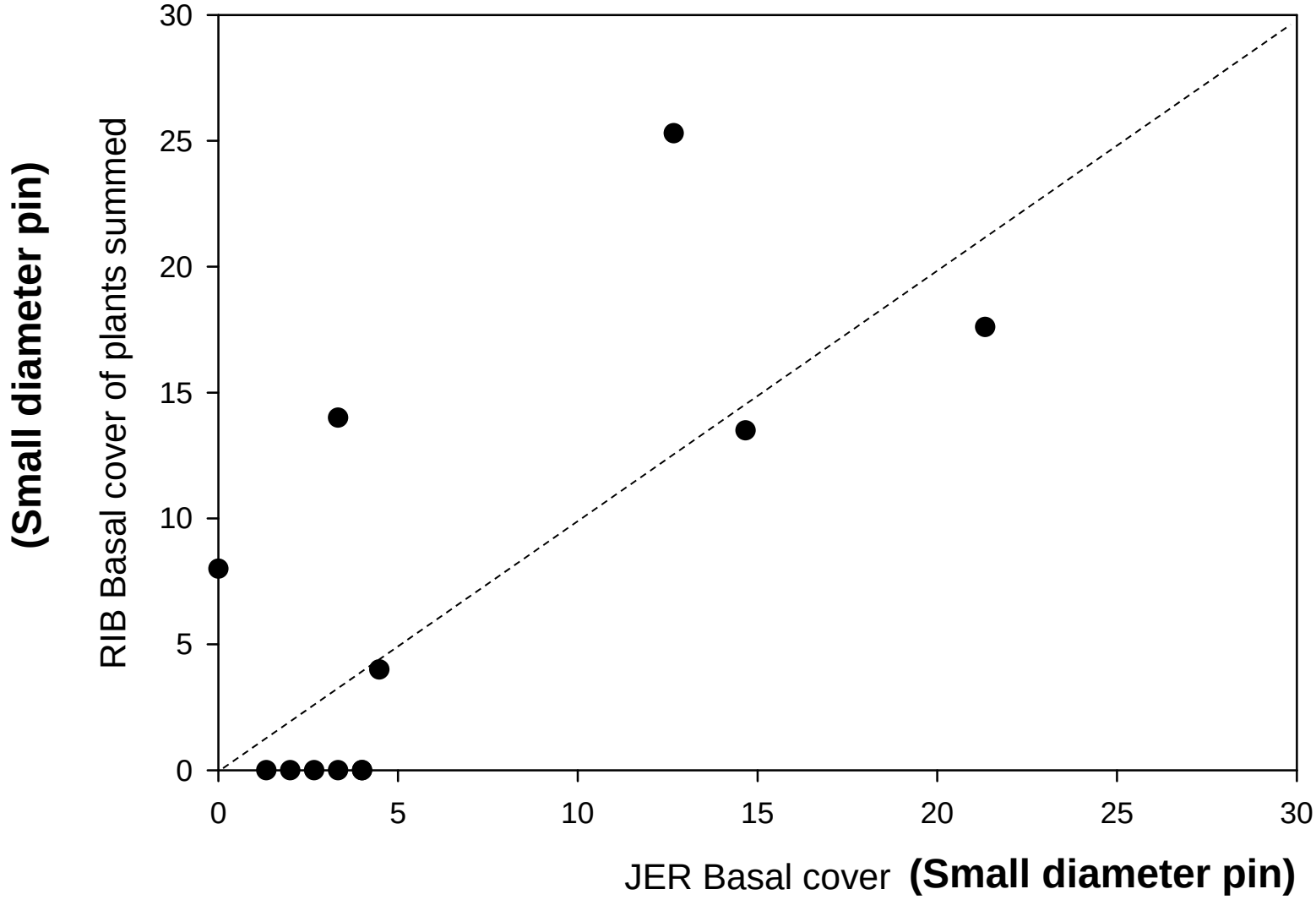

Ocular estimates
$r_s = 0.12$
$p = 0.7$
Black grama grasslands
$r_s = 0.98$
$p < 0.0001$
Creosotebush shrublands
$r_s = 0.89$
$p < 0.0001$
Mesquite shrublands
$r_s = 0.79$
$p = 0.001$
Tarbush shrublands
$r_s = 0.91$
$p < 0.0001$
Tobosa grasslands

	Mercy Corps	**Inst. of Botany**	**RIAH**	**Inst. Meteor.**	**Jornada**
Basal Cover	Bar-point	Ocular AND Point			Line-point
Foliar Cover	--				Line-point
Bare Ground	Bar-point				Line-point
Litter Cover	Bar-point				Line-point
Rock Cover	Bar-point				Line-point
Species Number	--				Line-point
Plant biomass	Clipping	Clipping	Clipping	Clipping	--

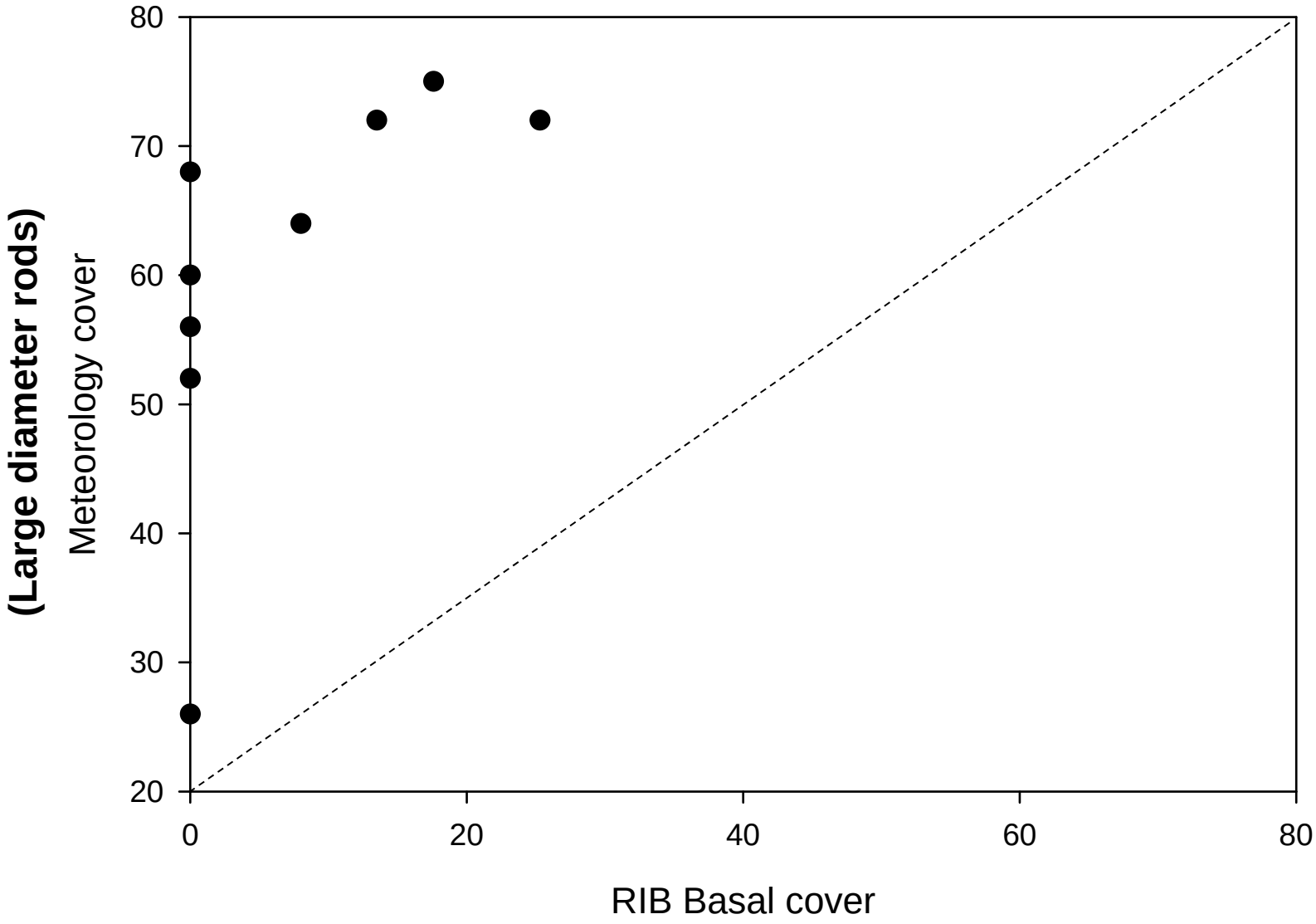
Basal Cover
(Average for All Sites)



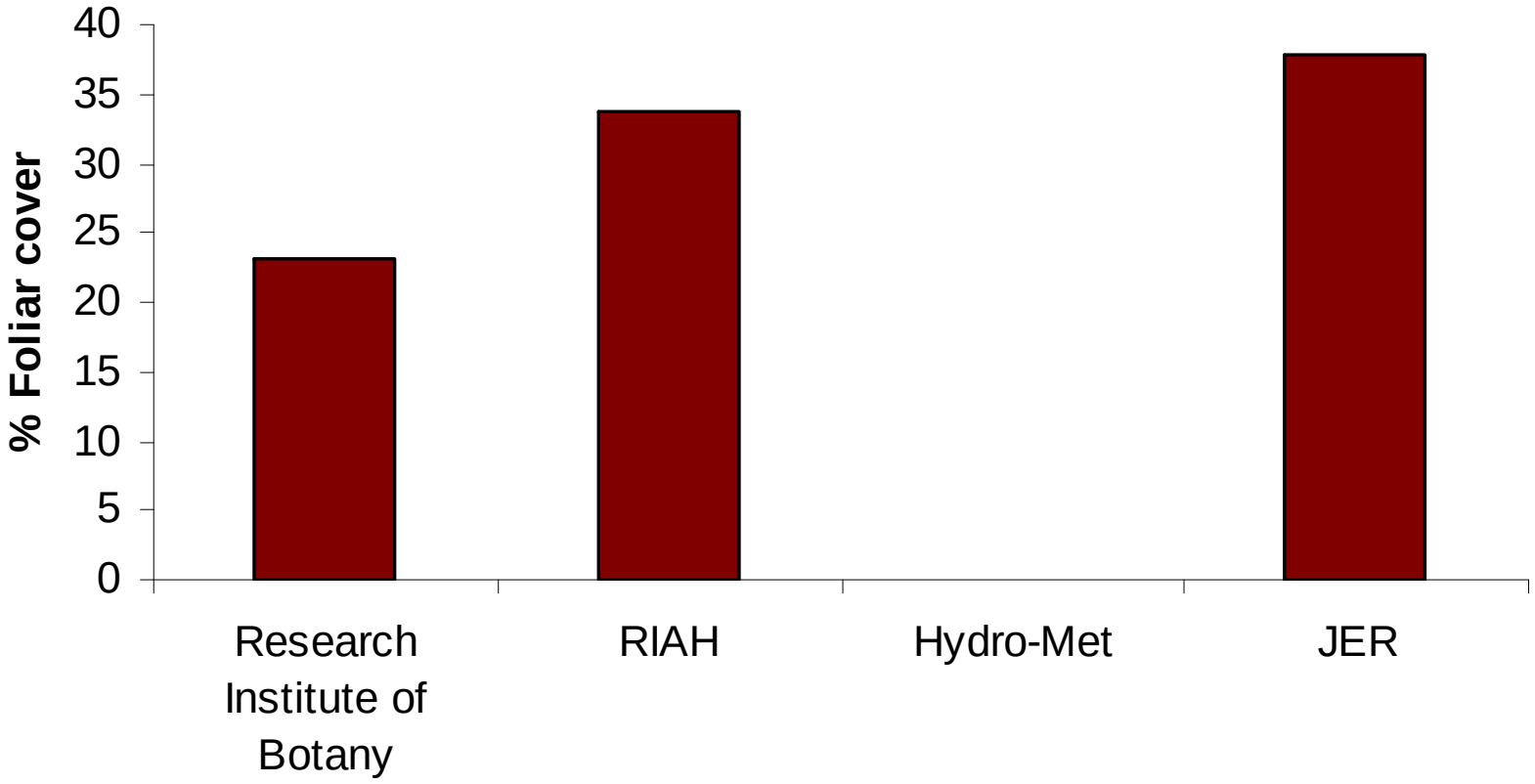

100
80
60
40
20
0
0
20
40
60
80
100
(Large diameter rods)
Meteorology cover
JER Basal cover
(Small diameter pin)

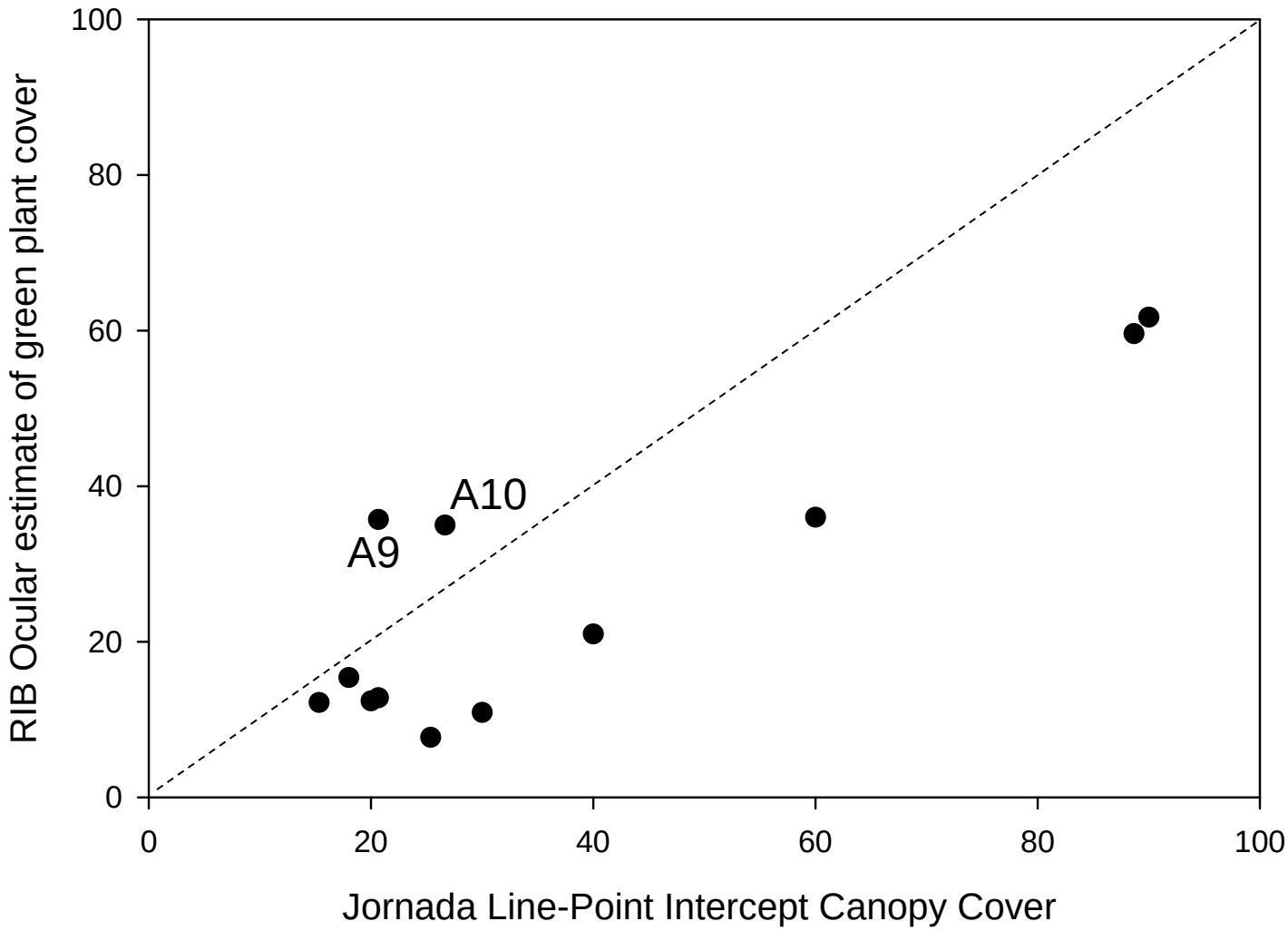

RIB Basal cover of plants summed
(Small diameter pin)
JER Basal cover (Small diameter pin)
0
5
10
15
20
25
30

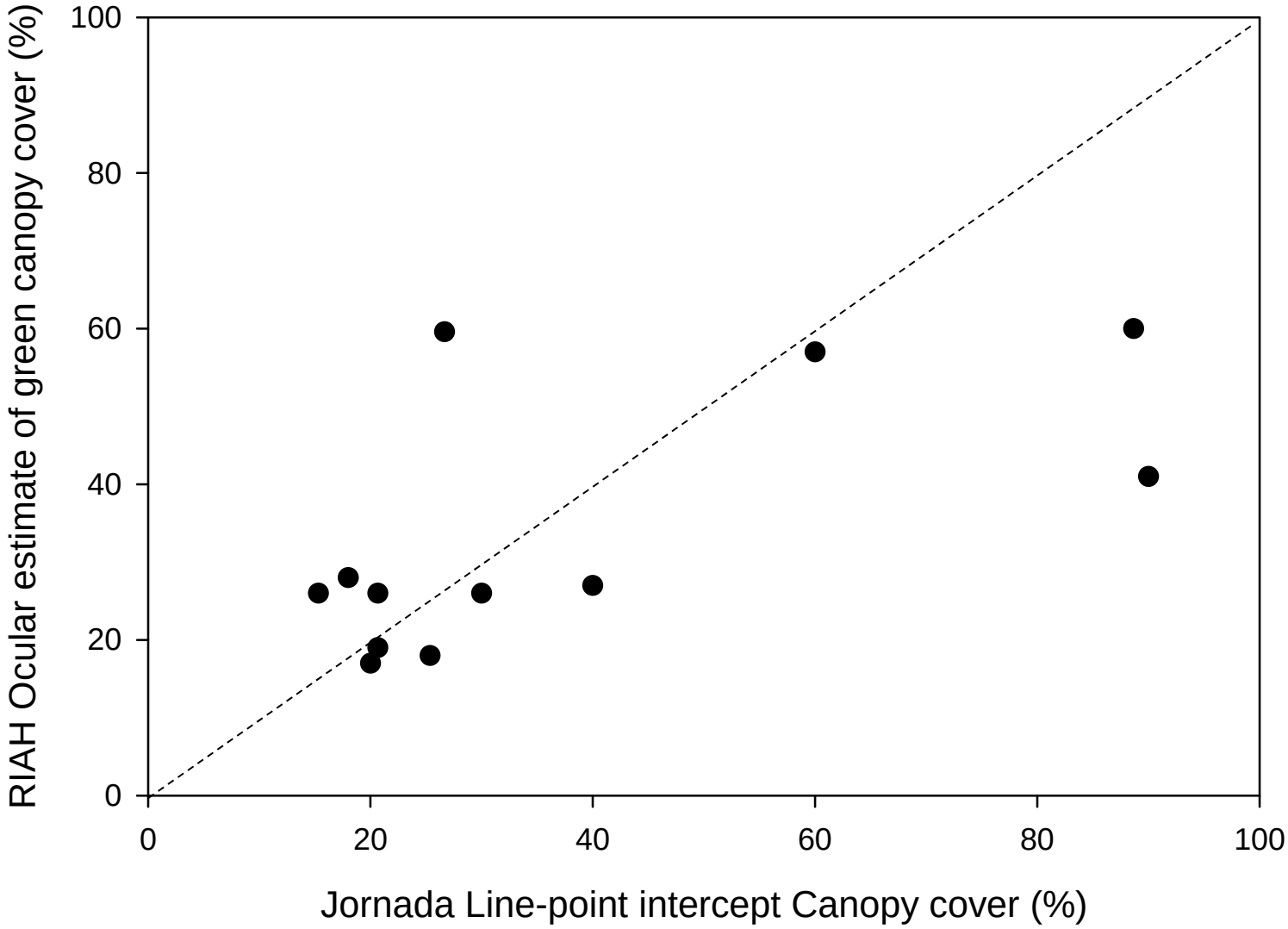
Conclusion: larger diameter pins overestimate cover

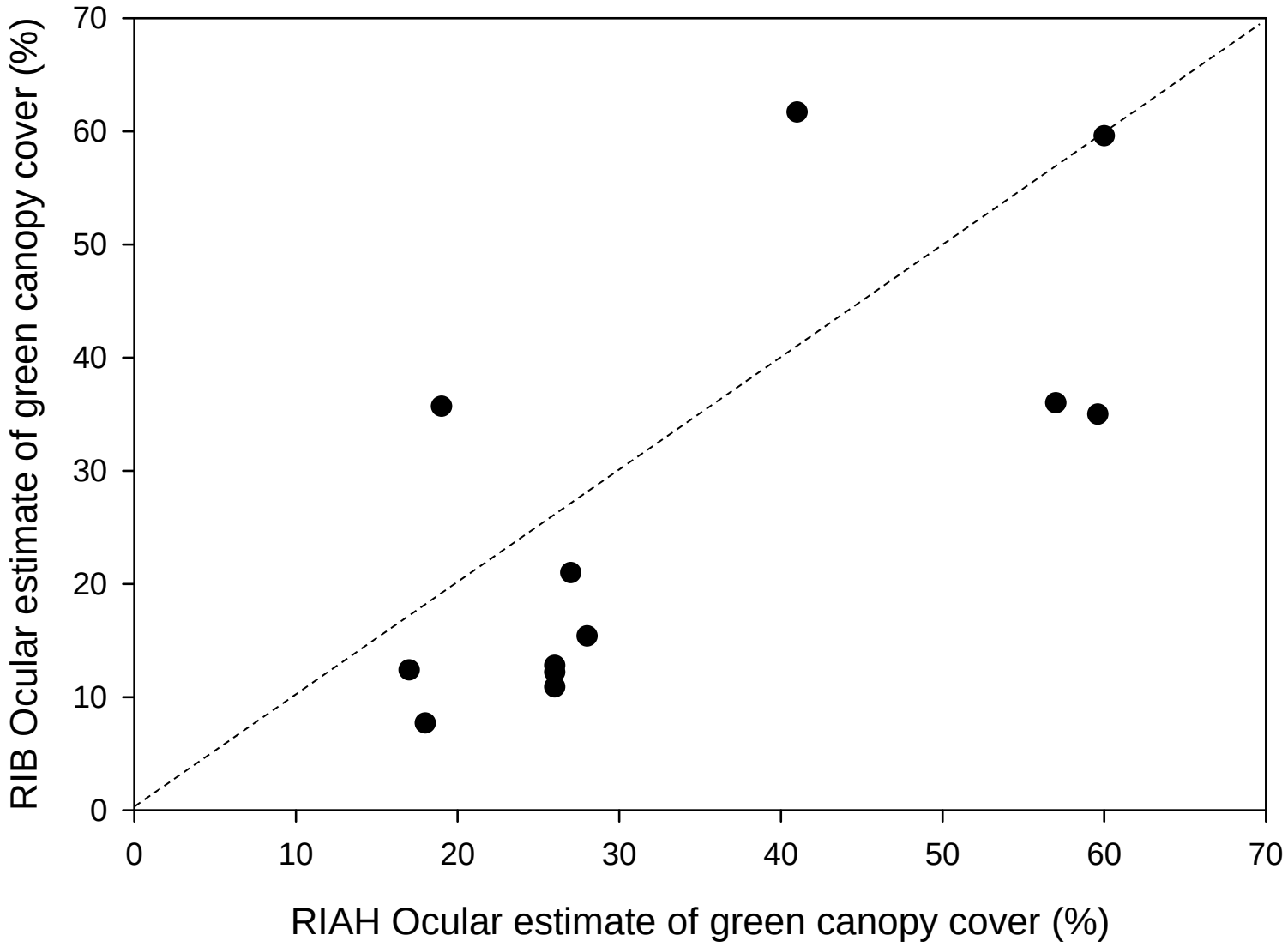


Foliar Cover
(Average for All Sites)

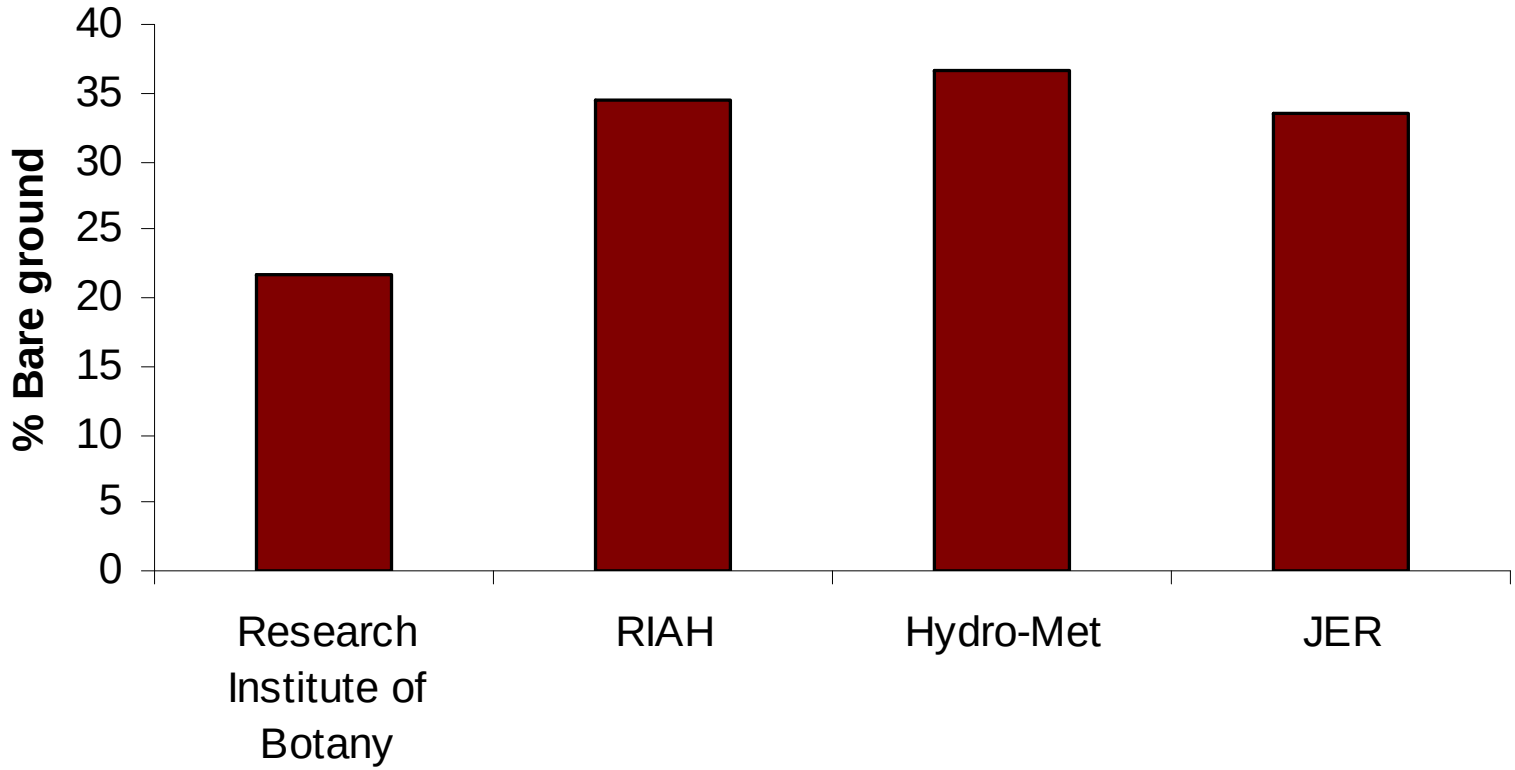



RIB Ocular estimate of green plant cover
Jornada Line-Point Intercept Canopy Cover
0
20
40
60
80
100
A10
A9

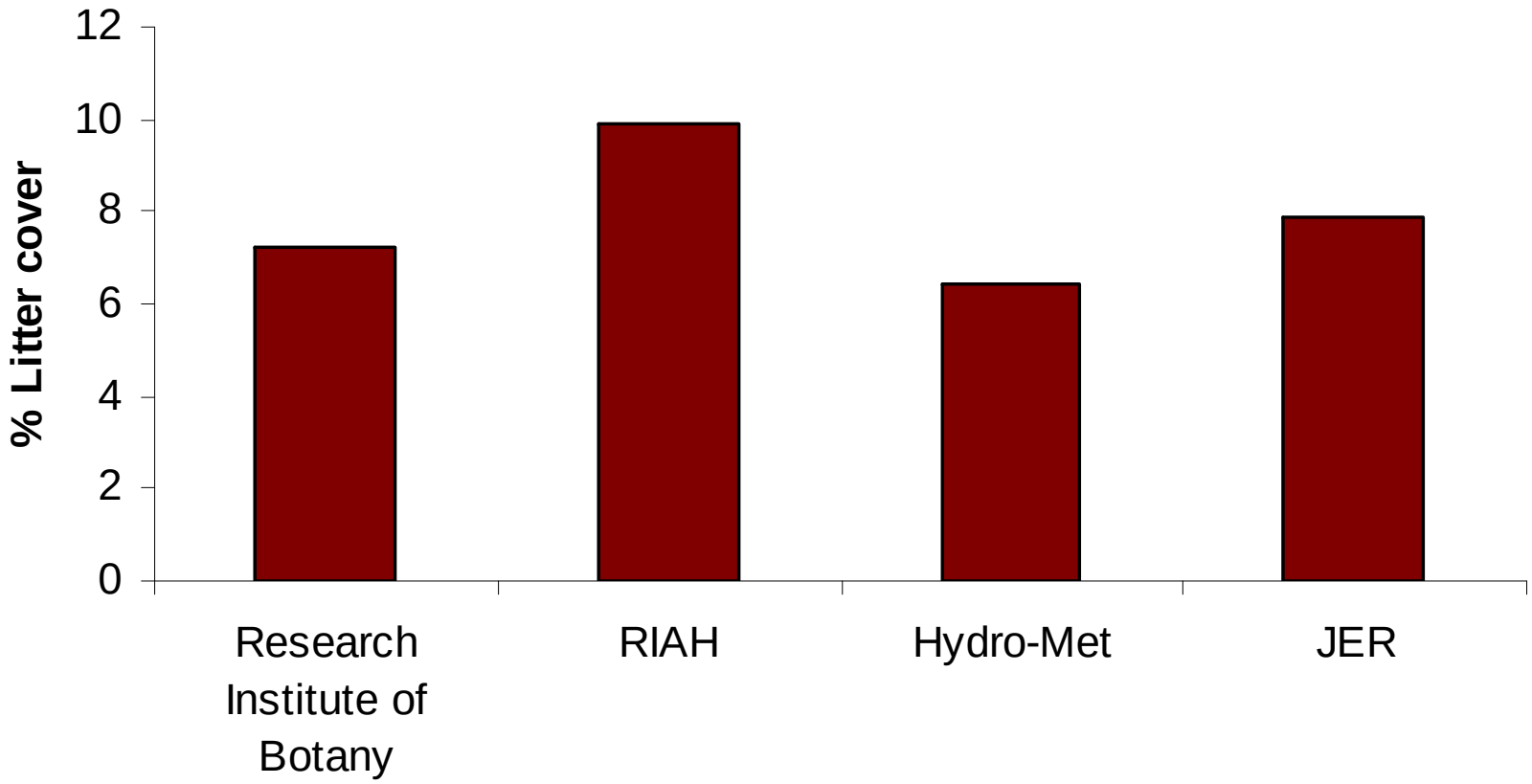

RIAH Ocular estimate of green canopy cover (%)
100
80
60
40
20
0
0
20
40
60
80
100
Jornada Line-point intercept Canopy cover (%)


RIB Ocular estimate of green canopy cover (%)
RIAH Ocular estimate of green canopy cover (%)
0
10
20
30
40
50
60
70

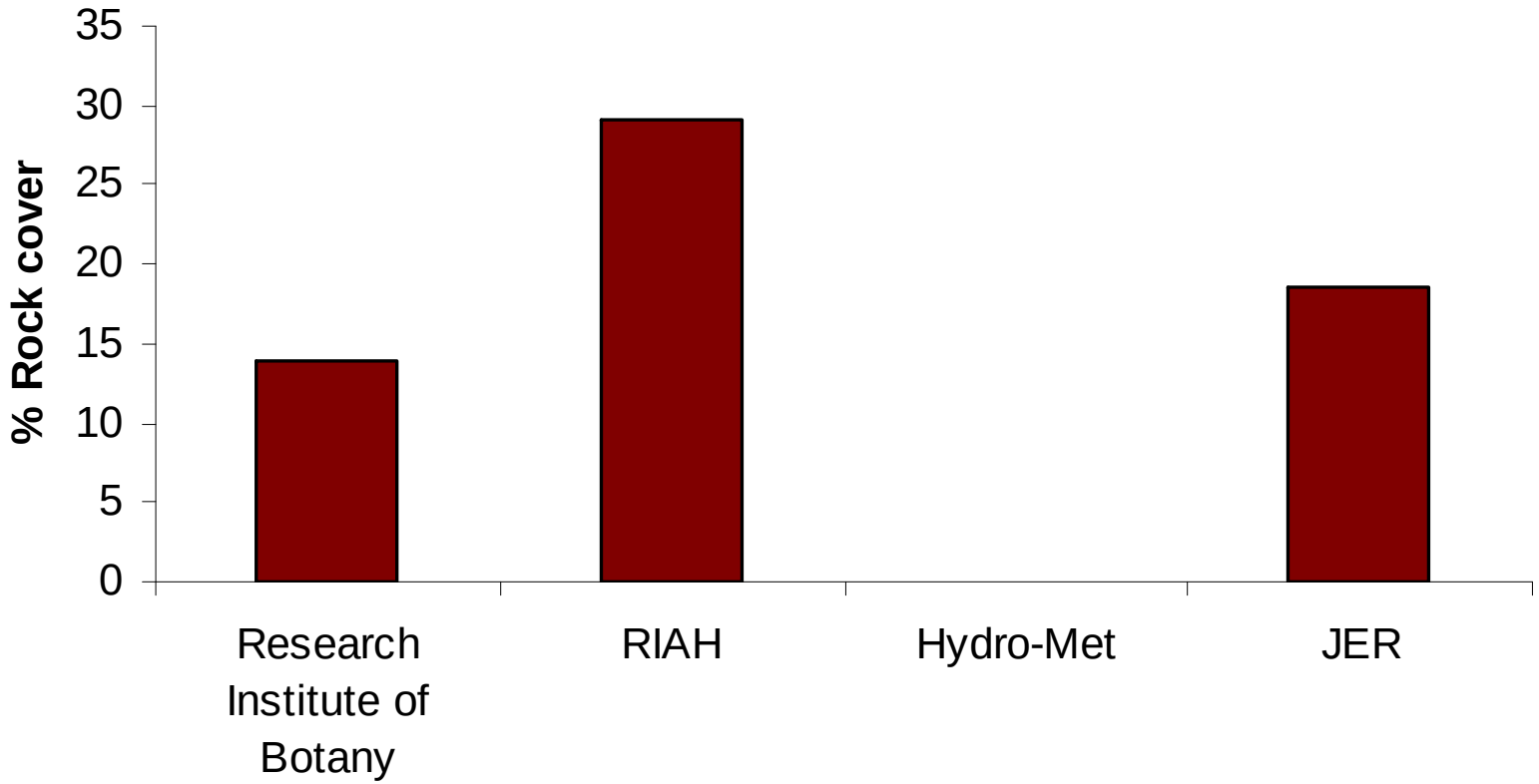
Bare ground
(Average for All Sites)



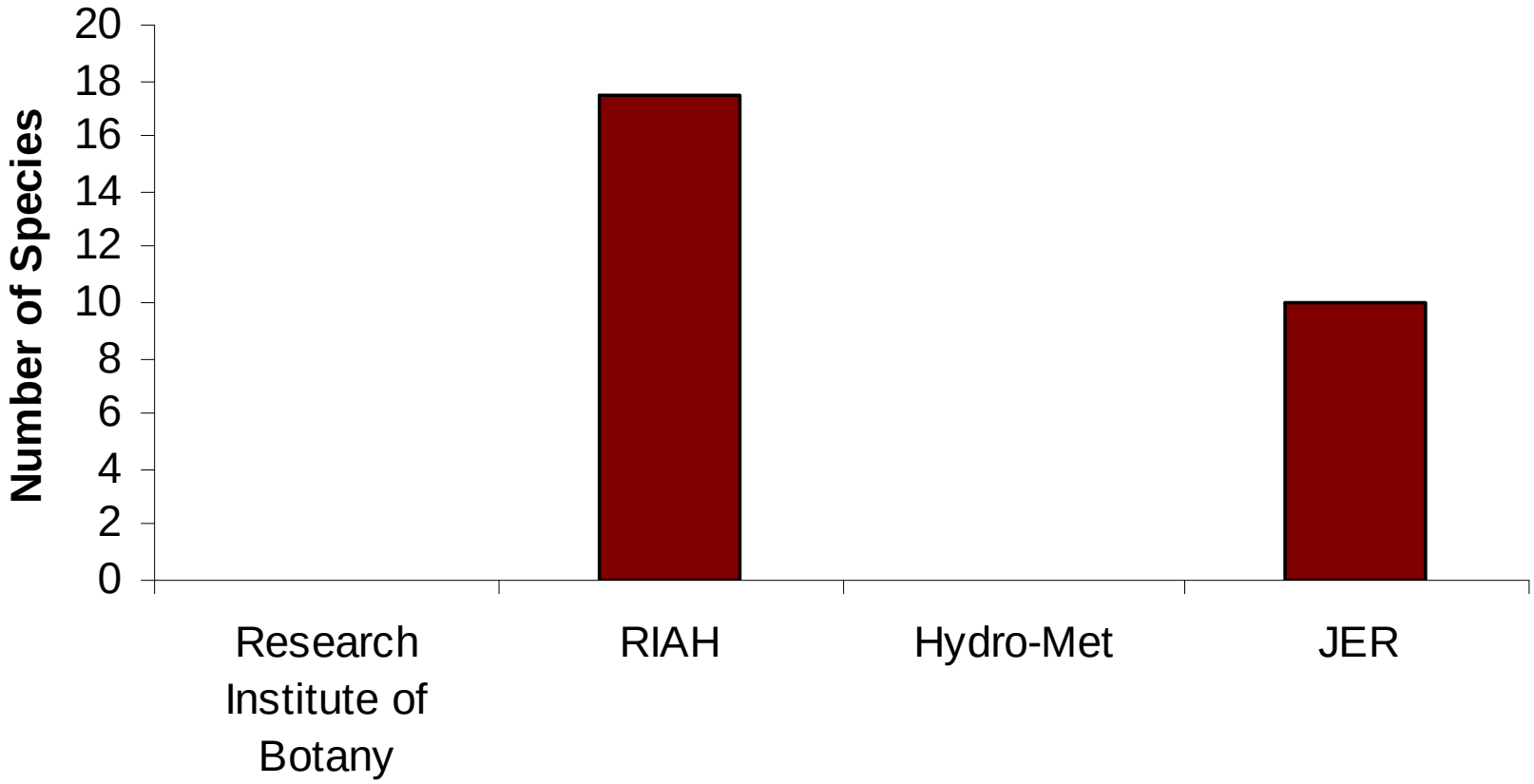
Litter Cover
(Average for All Sites)



Rock Cover
(Average for All Sites)



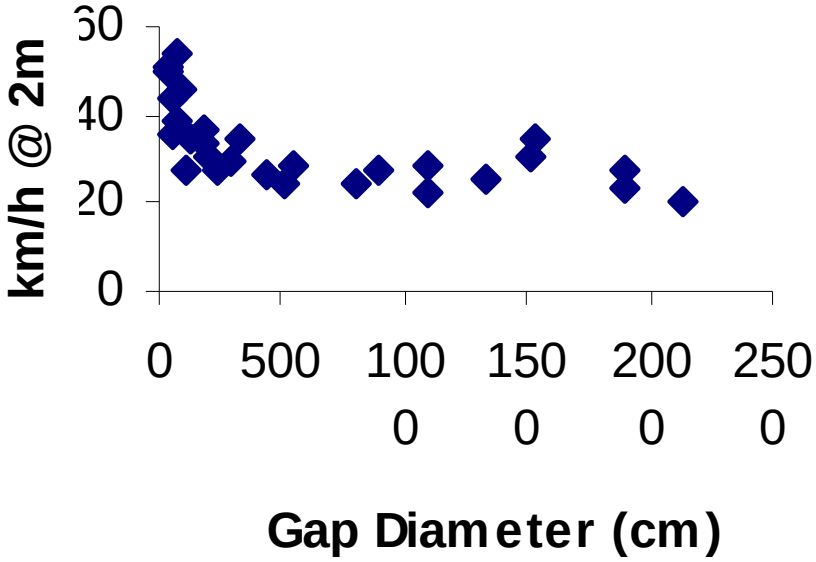
Number of Species (Average for All Sites)

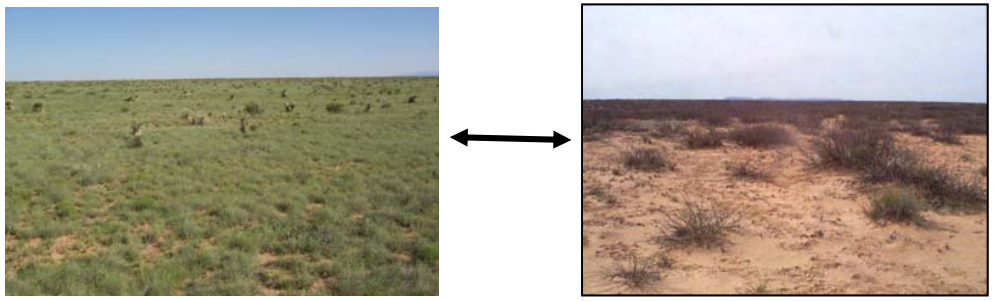


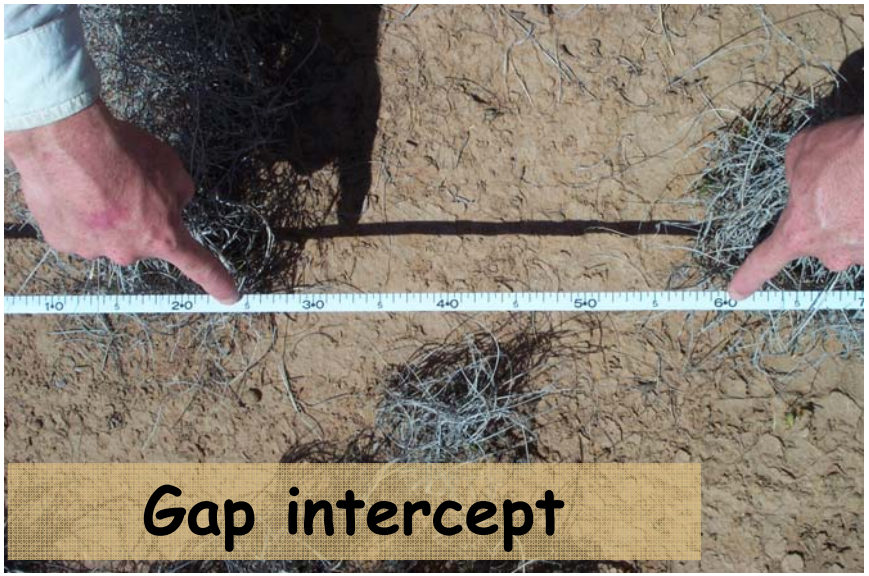
Conclusion: ocular estimates of large plots are better for maximizing changes in number of species

Indicator relationship: % soil surface exposed in large gaps → wind erosion (also applies to water)

Wind speed necessary to move sediment







Long-Term Methods: Gap intercept

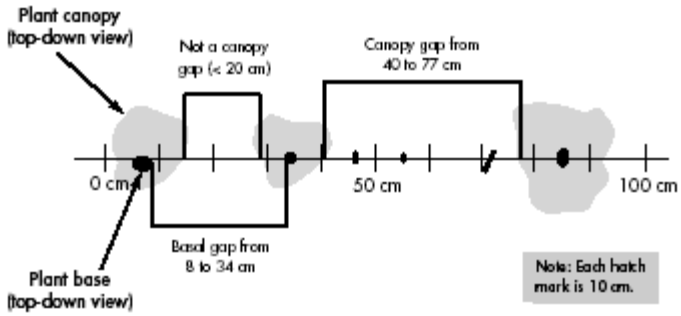


Figure 10. Example of canopy gap intercepts (above the line) and basal gap intercepts (below the line) for 1 m (100 cm) of a 50 m line. Canopy gaps: There is a gap between 40 and 77 cm because the plant canopies present do not cover more than 50% of any 3 cm segment. Basal gaps: There is a basal gap between 8 and 34 cm. Because the three small plant bases between 34 cm and 86 cm are all within 20 cm of an adjacent plant base, there are no basal gaps even though there is a canopy gap.

Table 4. Gap intercept data form example associated with Figure 10.

Canopy gaps: Minimum size = 20 cm							Basal gaps: Minimum size = 20 cm						
Starts	Ends	Gap size	25-50	51-100	101-200	>200	Starts	Ends	Gap size	25-50	51-100	101-200	>200
40	77	37	37				8	34	26	26			

When using feet instead of meters, use the decimal (1/10) side of the tape. Most long tape measures include inches on one side and 1/10s of feet on the other. This makes calculations much easier.

Key indicator

- Percent soil surface exposed in large gaps (important for invasive species and soil erosion)

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Multi-scale controls on and consequences of aeolian processes in landscape change in arid and semi-arid environments

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Abstract

Aeolian processes are tightly linked to soil and vegetation change in arid and semi-arid systems at multiple spatial and temporal scales. Wind influences patterns of vegetation and soil within the landscape, and these patterns control wind erosion at patch to landscape scales. Aggregated at larger scales, patterns in soil and vegetation distributions influence global distributions of dust and its biogeochemical impacts. Understanding the controls on aeolian processes is therefore important not only in understanding the biogeochemistry and land cover patterns in dryland environments, but also in understanding global land cover, climate, and biogeochemistry. Although the microscopic physics that control aeolian processes are well understood, the controls on these processes in real landscapes are poorly constrained, particularly for structurally complex plant communities such as shrub-invaded grasslands. This paper reviews the controls on aeolian processes and their consequences at plant-interspace, patch-landscape, and regional–global scales. Based on this review, we define the requirements for a cross-scale model of wind erosion in structurally complex arid and semi-arid ecosystems.

Keywords: Aeolian processes; Desertification; Dust emission; Landscape change; Wind erosion

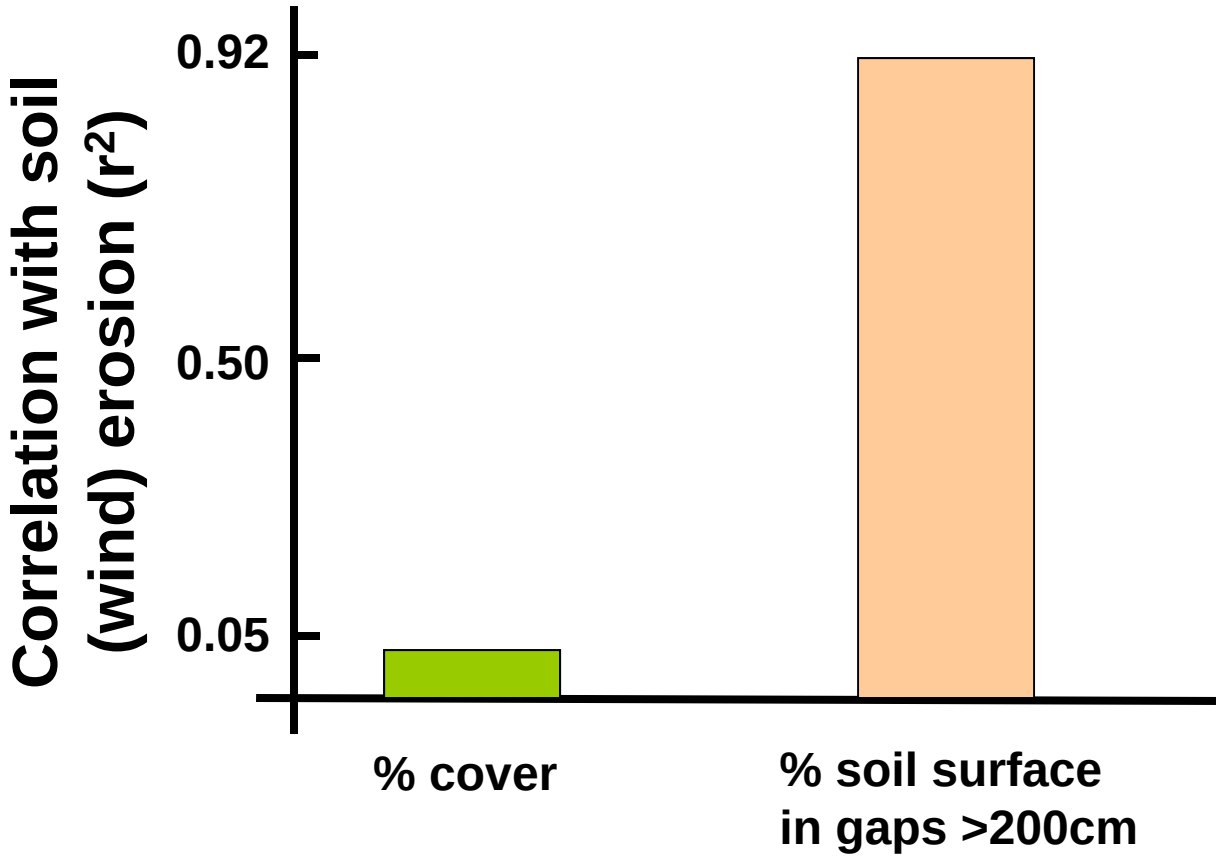
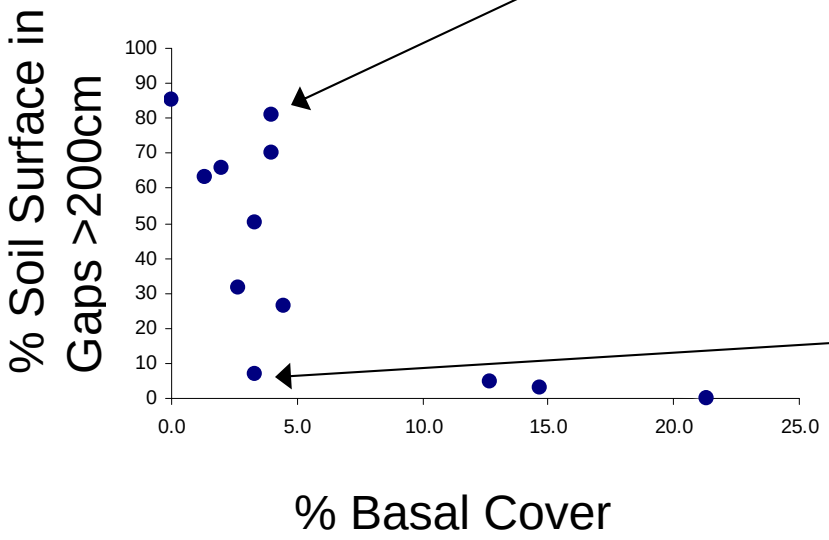
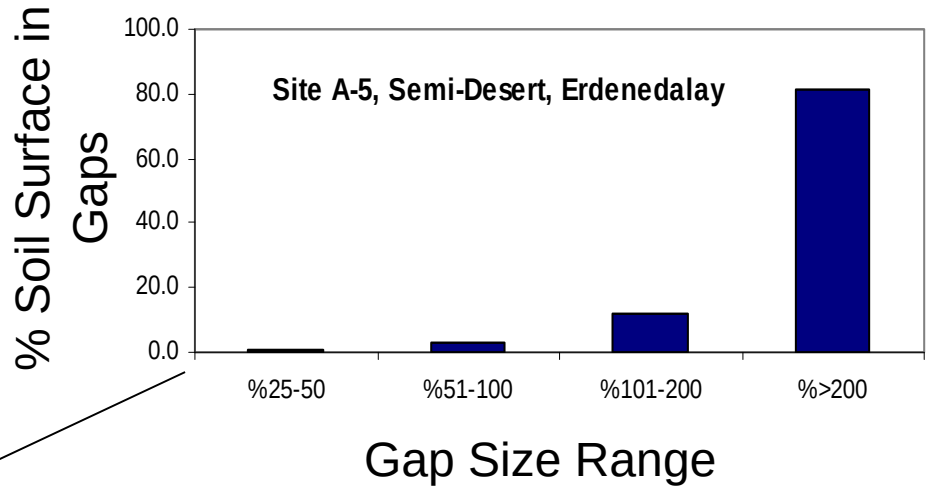


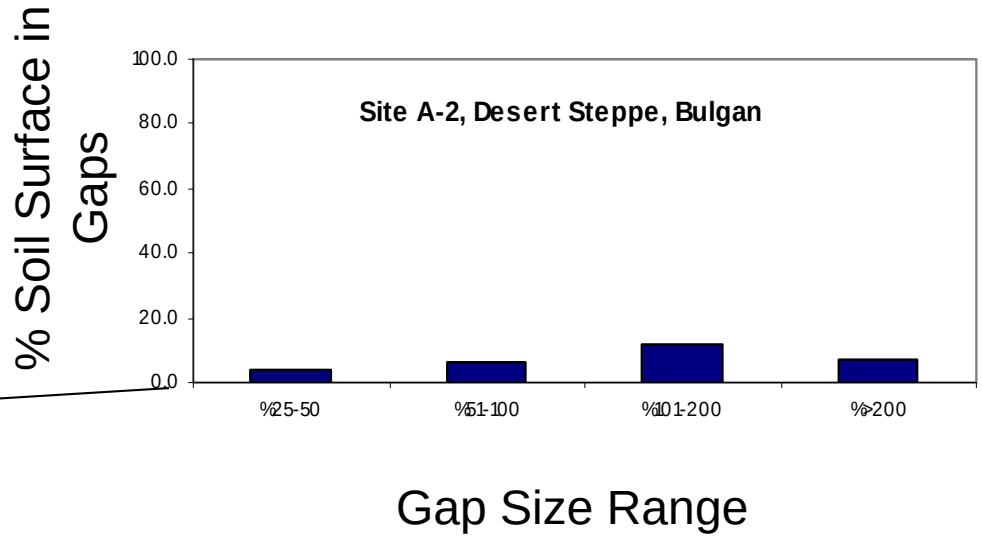
Table 2
Correlation and regression statistics between gap percent or fractional cover and horizontal flux

	Percent of 50-m transect comprised of gaps of size:					Fractional cover (%)
	25–50 cm	51–100 cm	101–200 cm	>200 cm	>500 cm	
Correlation	−0.88	−0.82	−0.97	0.96	0.75	−0.22
Slope	−30.66	−13.29	−10.02	4.97	14.21	−11.93
Intercept	266.14	264.14	325.04	−102.32	−980.28	286.06
R^2	0.77	0.68	0.95	0.92	0.56	0.05

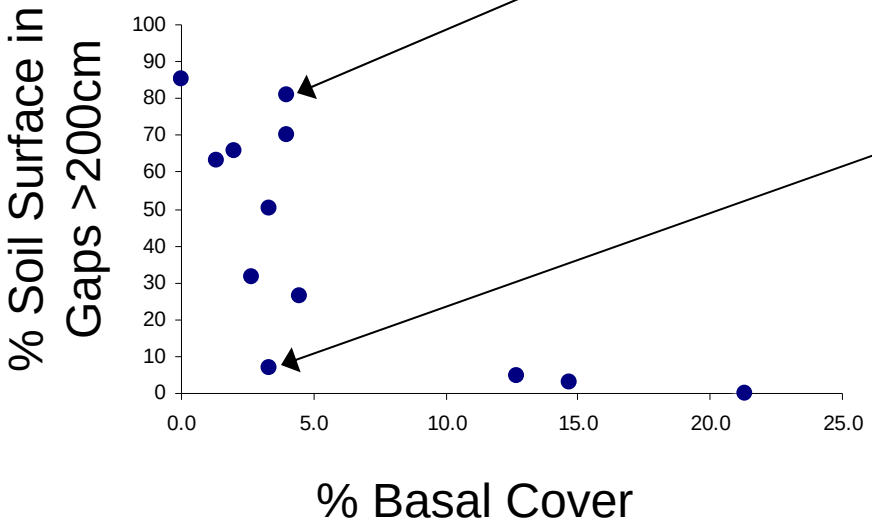
Relationship Between % Basal Cover and Spatial Distribution (Gaps)







Relationship Between % Basal Cover and Spatial Distribution (Gaps)



Conclusions and Recommendations

Conclusions

- International research shows point-based methods are more consistent than ocular estimates and therefore are more appropriate for monitoring changes in cover (although ocular estimates are better for species richness)
- Point-based methods can be used to measure many indicators (foliar cover, basal cover, litter cover, bare ground, etc…), so the number of measurements can be reduced
- Point-based methods must be standardized to use very small points (pins)
- The methods compared use many different sizes of points (wire pins, metal rods 0.2-2cm diameter)
- None of the methods provide indicators of size of bare ground patches

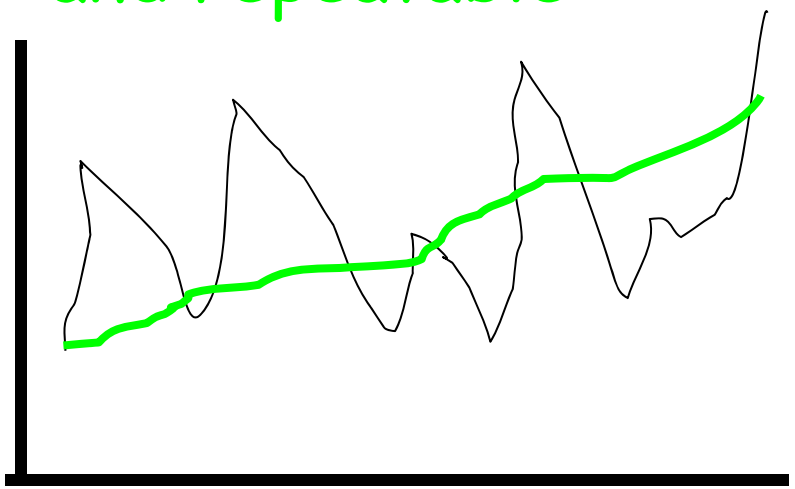
Recommendations: standardization

- Use small wires (same diameter) for point intercept
- Record basal AND foliar cover with point intercept
- Use tapes to ensure consistent transect length and faster measurements
- Drying method needs to be standardized for biomass

Recommendations: data gaps

- Add ‘basal gap intercept’ to monitor size of bare ground patches

- Quantitative data are often more ***precise*** and repeatable



- Either qualitative OR quantitative can be more ***accurate***