

## **SUPPLEMENTARY MATERIAL**

### **Walter's two-layer hypothesis revisited: back to the roots!**

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**Electronic Supplement.** Evidence for and against Walter’s two-layer hypothesis. We used Sankaran’s 650 mm MAP to differentiate dry from moist savannas. We used keywords as indicated in the *Methods* to search for appropriate papers. MAP = Mean annual precipitation; W = water use (including measurements of soil or plant water potentials, soil water content or stable isotope ratios); NP = National Park; GR = Game Reserve. \* = claimed no support for the two-layer hypothesis but only tested overlap in the upper soil layer, yet provided ample evidence that the shrub *Larrea divaricata* had deeper roots than the grass *Stipa tenuis*

Vegetation system	Location	MAP (mm)	Seasonality of rainfall	Depth of excavation (cm); W	Woody fine roots < 2mm recorded	Evidence for two-layer hypothesis	Reference
<b>Temperate</b>							
1) Tallgrass prairie	Iowa, USA	882	summer/ winter	150, W	no	yes	Asbjornsen et al. 2008
2) Tallgrass prairie	Kansas, USA	835	summer/ winter	W	-	yes	Nippert and Knapp 2007
3) Moist savanna	Texas, USA	680	summer/ winter	120	no	yes	Brown and Archer 1990
4) Moist savanna	Texas, USA	665	summer/ winter	270, W	yes	yes	Ansley et al. 2007
5) Dry savanna	Arizona, USA	602	summer/ winter	W	-	yes	Weltzin and McPherson 1997
6) Sandhills	Nebraska, USA	573	summer/ winter	W	no	yes	Eggemeyer et al. 2008
7) Dry savanna	N.-California, USA	559	winter	W	-	yes	Baldocchi et al.2004
8) Dry savanna	Arizona, USA	347	summer/ winter	60	no	yes	Cable 1969

9) Dry steppe	La Pampa, Argentina	344	spring/ autumn	W	-	partial	Peláez et al. 1994
10) Dry steppe	Colorado, USA	321	summer	200	no	yes	Lee and Lauenroth 1994
11) Dry steppe	Colorado, USA	321	summer	180, W	-	yes	Dodd et al. 1998
12) Semi-desert	Chihuahuan desert, Mexico	264	summer	70	no	yes	Montaña et al. 1995
13) Dry steppe	Patagonia, Argentina	236	summer/ winter	50, W	yes	yes*	Rodriguez et al. 2007
14) Semi-desert	Utah, USA	215	summer/ winter	W	-	yes	Schwinning et al. 2002
15) Dry steppe	Patagonia, Argentina	170	winter	W	-	yes	Sala et al. 1989
16) Dry steppe	Patagonia, Argentina	168	winter	40, W	no	yes	Soriano and Sala 1983
17) Semi-desert	Utah, USA	150	summer/ winter	W	-	yes	Ehleringer et al.1991
18) Dry steppe	Patagonia, Argentina	137	winter	60	no	yes	Golluscio et al. 1998
<b>Subtropical/tropical</b>							
19) Moist savanna	Lamto, Ivory Coast	1200	summer	200	yes	no	Le Roux et al. 1995
20) Moist savanna	Lamto, Ivory Coast	1200	summer	120, W	yes	no	Mordelet et al.1997
21) Moist savanna	Queensland, Australia	1103	summer	100	yes	partial	Zerihunet al. 2006
22) Moist savanna	Mole GR, Ghana	1000	summer	70	no	partial	Lawson et al. 1968

23) Moist savanna	Highveld, Zimbabwe	890	summer	185, W	no	yes	Strang 1969
24) Moist savanna	Diamaré plain, Cameroon	800	summer	150	no	partial	Seghieri 1995
25) Moist savanna	Nairobi NP, Kenya	786/ 1034	summer	W	-	yes	Hesla et al. 1985
26) Moist savanna	Tsavo NP, Kenya	767	summer	120	not strictly	no	Belsky 1994
27) Moist savanna	Darwin, Australia	1708	summer	60, W	yes	no	February et al. 2012
28) Moist savanna	Kruger Park, South Africa	746	summer	W	no	no	Kulmatiski et al. 2010
29) Moist savanna	Kruger Park, South Africa	740	summer	100, W	no	no	Verweij et al. 2011
30) Dry savanna	Nylsvley, South Africa	630	summer	120	no	yes	Knoop and Walker 1985
31) Dry savanna	Tsavo NP, Kenya	450	summer	120	not strictly	yes	Belsky 1994
32) Dry savanna	Kalahari, Botswana	365/ 400	summer	120, W	no	no	Hipondokaet al. 2003
33) Dry savanna	Barkly West, South Africa	380	summer	pot expt. to 60 cm, W	yes	yes	Kambatuku et al. 2012
34) Dry savanna	Northern Province, South Africa	376	summer	W	-	yes	Smit and Rethman 2000
35) Desert	Springbok, South Africa	131- 150	winter	50	yes	yes	Shiponeni et al. 2011
36) Desert	Paulshoek, South Africa	116	winter	60, W	no	yes	February et al. 2011