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(*Pinus eldarica* Medw.)

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(Van Der Salm et al., 2007)

Shachnovich et)

(al., 2008.

(Mahdavi, 2005)

(Ministry of Energy, 2006)

(Alizadeh, 2009)

(Herbst et al., 2006)

(Grünzweig et al., 2003)

(Zhou et al., 2002)

(Hüttl et al., 2000)

(Chang, 2003)

Zhou et al., 2002; Hanson et al.,)

(2004

² Interception loss (*I*)
³ Canopy water storage capacity (*S*)
⁴ Throughfall (*TF*)
⁵ Free throughfall (*p*)
⁶ Stemflow (*SF*)

¹ Afforestation



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Valente et)
al., 1997; Kelliher et al., 1992; Staelens et al.,
(2008; Cao et al., 2007; Loustau et al., 1992

(

,2009; Ghorbani, 2007;)

(Bagheri, 2011

(SE = ± /)

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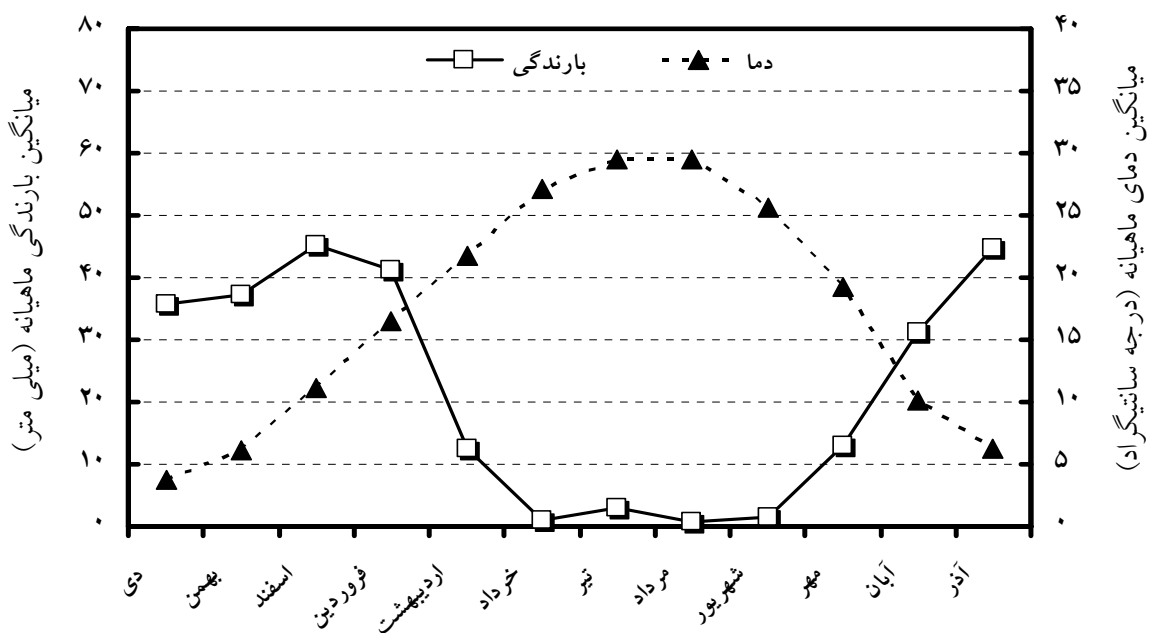
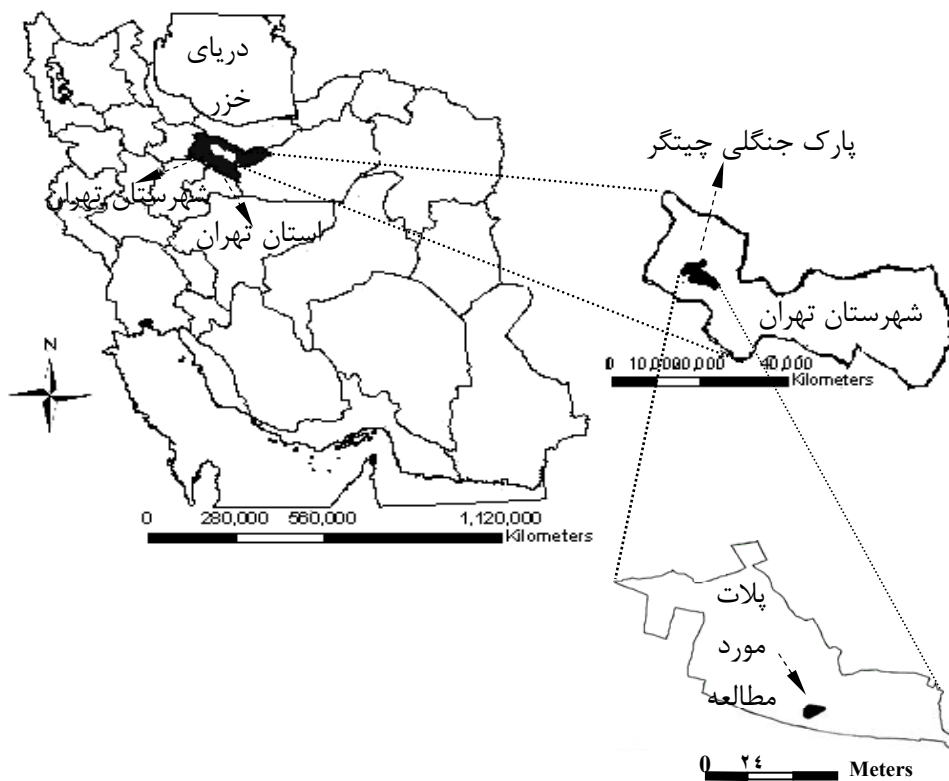
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(*Pinus eldarica* Medw.)

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(SE = ± /)

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Llorens et al., 1997;)

(Llorens & Gallart, 2000

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Shachnovich et al., 2008;)

(Koichiro et al., 2001; Johnson, 1990

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$$I = GR - TF$$

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(Carlyle-Moses et al., 2004)

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$$I = GR - (TF + SF)$$

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:GR

:I

:SF

:TF

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(Cao et al., 2008)

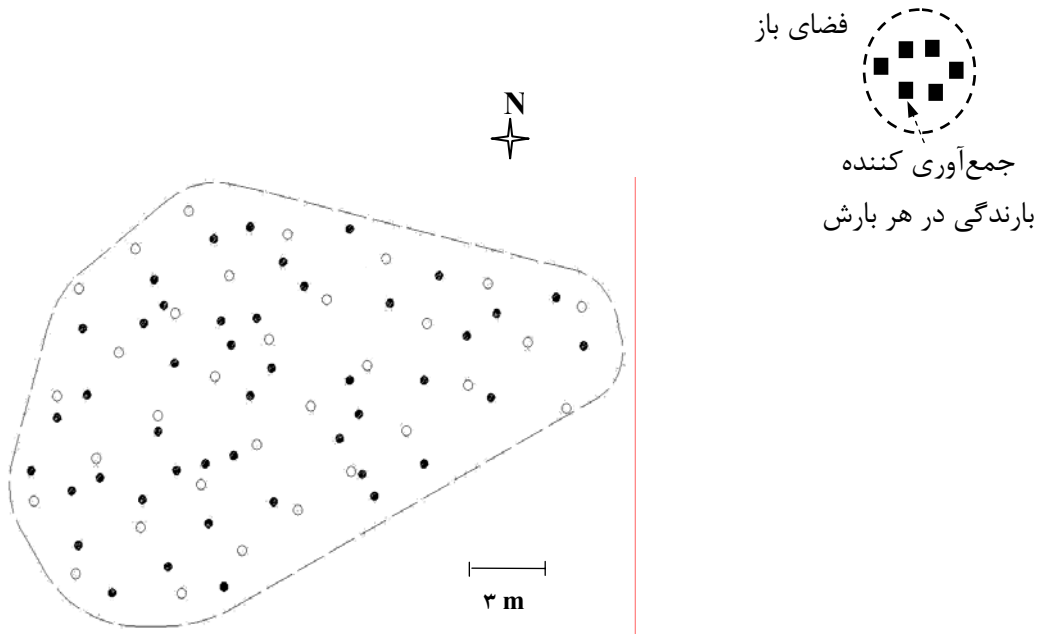
(GR)

(I:GR)

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¹ Gross Rainfall (GR)

² Rainfall Collector



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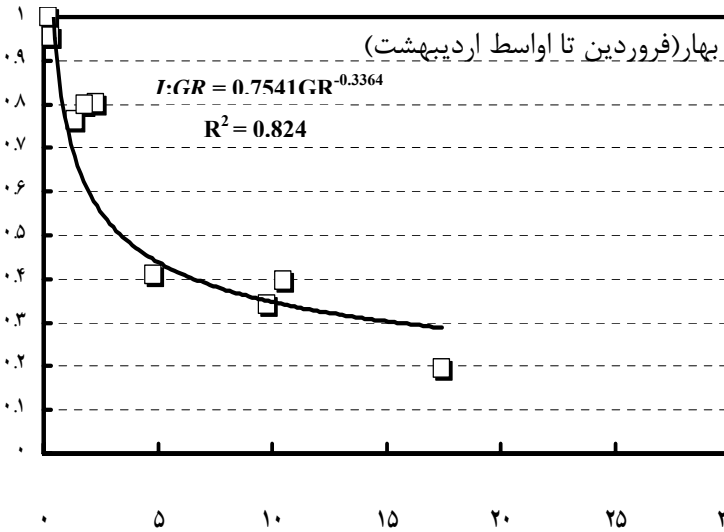
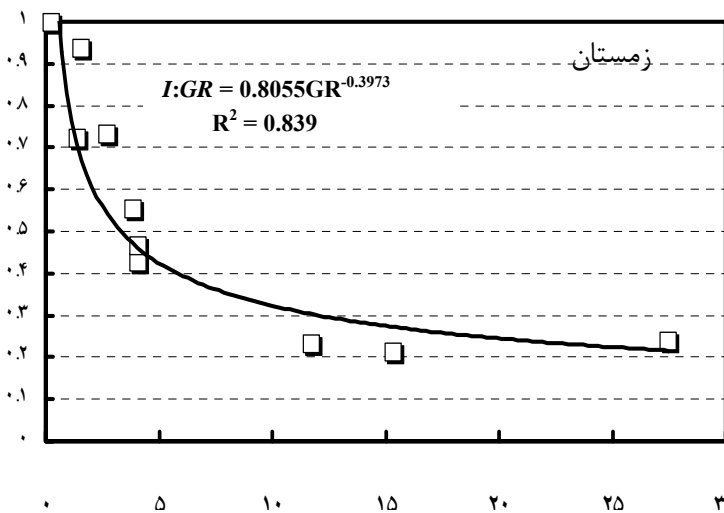
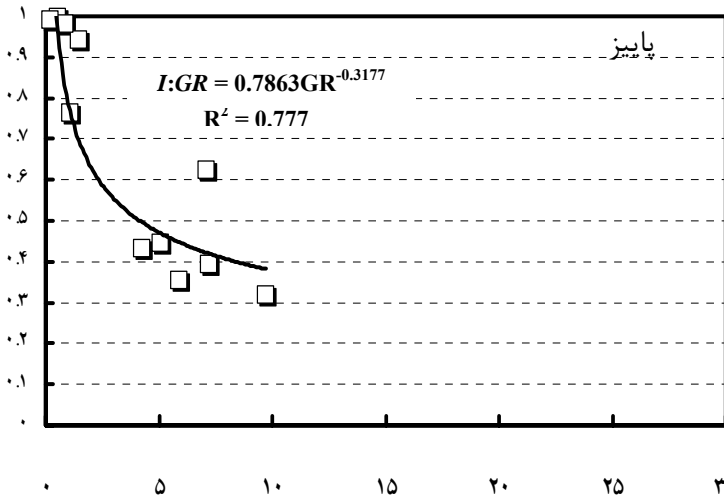
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نسبت باران‌رسانی به بارندگی در هر بارش (I:GR) نسبت باران‌رسانی به بارندگی در هر بارش (I:GR) نسبت باران‌رسانی به بارندگی در هر بارش (I:GR)



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(GR)

(I:GR)

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Xiao et al., 2000.; Iroumé)
& Huber, 2002; Carlyle-Moses, 2004; Fleischbein
et al. 2005; Deguchi et al., 2006; Staelens et al.,
(2008

e.g. Helvey & Patric, 1965; Leyton et al., 1967;)
(Zinke, 1967

(Augusto et al., 2002)

Xiao et al. 2000; Iroumé & Huber,
(2002; Carlyle-Moses, 2004; Staelens et al. 2008

(Ahmadi et al., 2011)

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Llorens et al.() .

Pinus sylvestris

Mahendrappa

Pinus strobus ()

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Cao et al. (2008) .

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/ *Eucommia ulmoides*

Pinus / *Vernicia fordii*

massoniana

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(Hibbert, 1967; Zinke, 1967)

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Owens)

et al., 2006; Deguchi et al., 2006; Staelens et al.,
(2008

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Rainfall size and interception of a *Pinus eldarica* afforestation in a semi-arid climate zone (Chitgar Forest Park)

M. Motahari¹, P. Attarod^{2*}, V. Etemad² and A. shirvany²

¹ M.Sc. Candidate, Faculty of Natural Resources, University of Tehran, I.R. Iran

² Assistant Prof., Faculty of Natural Resources, University of Tehran, I.R. Iran

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Abstract

Rainfall interception loss (I) is an important component of water balance in arid and semi-arid climate zones. The goal of this project was to quantify interception of different seasons and to determine the role of rainfall size in controlling interception in a mature semi-arid *Pinus eldarica* Medw. afforestation in Chitgar Forest Park near Tehran, Iran, where mean annual precipitation, and air temperature are 267.6 mm and 17.2°C, respectively. The gross rainfall (GR) was measured based on average records of six manual collectors installed in an open area adjacent to the stand and throughfall (TF) was collected by means of forty five manual collectors, similar to GR collectors, placed randomly beneath the canopy. Interception was calculated as the difference between GR and TF . Measurements were recorded based on rainfall events from September, 2009 to May, 2010. For the study period with 30 recorded rainfall events, GR and rainfall interception loss (I) totaled 164.8 and 61.2 mm respectively. The ratio of $I:GR$ had a range of 19.5% to 100%, with 61.4% as the average value. During this period, the cumulative GR depths of 11, 10, and 9 rainfall events in autumn, winter, and spring were 43.6 mm ($I= 65.8\%$), 72.6 ($I= 55.1\%$), 48.6 mm ($I= 62.9\%$), respectively. On the event scale, there was a strong logarithmic correlation between $I:GR$ and GR in all seasons. As the size of rainfall events increased, the ratio of $I:GR$ decreased. The results demonstrated that intercepted rainfall represents a considerable portion of GR in *P.eldarica* afforested regions of the semi-arid climate zone of Iran where soil moisture is a limiting factor in plant growth and productivity.

Keywords: Afforestation, Chitgar Forest Park, *Pinus eldarica*, Rainfall interception, Semi-arid climate zone, Rainfall size