

畝間灌漑を改良した簡易サージフロー灌漑法は浸透損失を抑制し節水できる

Simplified surge flow with improved furrow irrigation reduces infiltration loss and saves water

乾燥地の灌漑農地では、過剰灌漑によって塩類が集積し、農業生産に悪影響が生じている。畝間灌漑での節水技術として、間断的に給水するサージフロー灌漑法(SF法)がある。現地での適用を容易にするため、このSF法を簡素化した簡易SF法を開発した。簡易SF法では、通常の畝間灌漑(慣行法)では1回、SF法では4回程度に分ける給水を1日間隔で2回に分けて給水する(図1)。

湿潤した畝間の積算浸透水量は、乾燥状態と比べ67%減少する。給水速度 1.7 Ls^{-1} にて簡易SF法を適用した場合、第2回灌漑の水流が速くなり、畝間50 mで22%、畝間100 mで19%の節水効果がある(表1)。

In arid lands, salt accumulation due to excessive irrigation has negative effects on agricultural production. Surge flow irrigation (SF) saves water in such areas by supplying water intermittently. We improved on this by developing the simplified SF, in which water is supplied two times at 1-day intervals. (By contrast, conventional is applied once and SF is applied 4 times)(Fig. 1).

Cumulative infiltration on wet furrow is decreased by 67% compared with dry furrow. Applying simplified SF at 1.7 Ls^{-1} accelerated water advance during 2nd irrigation, and the water-saving effects at 50 m and 100 m of the furrow are 22% and 19%, respectively (Table 1).

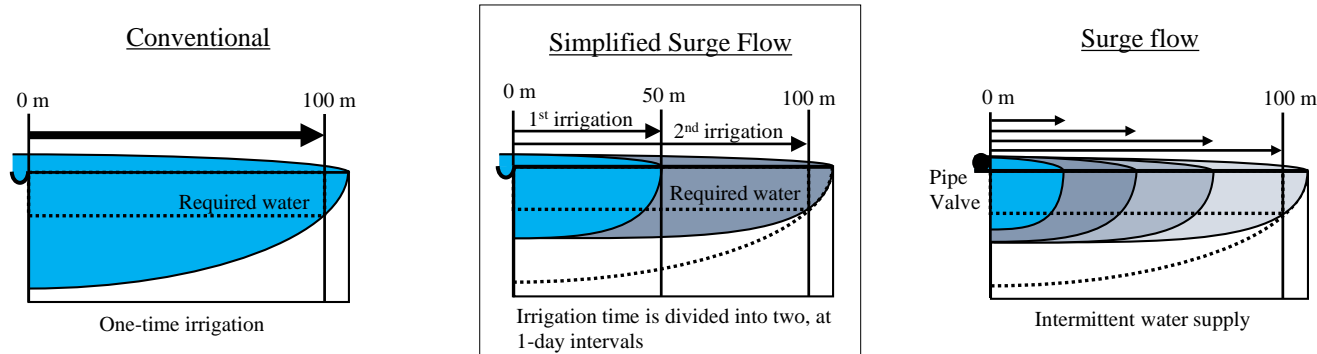


図1 簡易サージフロー灌漑法と従来法の比較

Fig. 1. Comparison between the simplified SF and conventional furrow irrigation

表1 簡易サージフロー灌漑法による節水効果と適用効率

Table 1. Water-saving effect and application efficiency of the Simplified Surge Flow

Inflow (Ls ⁻¹)	Length (m)	Required water [RW] (m ³)	Treatment	Time (sec)		Supplied water [SW] (m ³)		Water-saving ratio ^{*)} (%)	Application efficiency [RW/SW] (%)
				Ave	Std	Ave	Std		
1.70	100	2.45	Conventional	3,289	88.2	5.59	0.15	-	43.8
	100	2.45	Simplified SF	2,667	229.3	4.53	0.39	19.0	54.1
	50	1.22	Conventional	1,299	152.6	2.21	0.26	-	55.2
	50	1.22	Simplified SF	1,014	57.5	1.72	0.10	22.2	70.9
5.00	100	2.45	Conventional	1,148	95.7	5.74	0.48	-	42.7
	100	2.45	Simplified SF	1,392	99.0	6.96	0.50	-21.3	35.2

^{*)} Ratio of water-saving amount by Simplified SF to amount of supplied water by conventional over the same length of the furrow