

REFLECTION OF POTATO VARIETIES TO MIDSEASON WATER LIMITATION

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ABSTRACT

Climate change is expected to exacerbate drought events throughout the world, resulting in large-scale ecosystem alteration and failure of drought-sensitive crops. In addition, periods of drought vary from year to year both in severity and length, making it difficult for plants to adapt to more severe conditions. Many modern varieties of potatoes are considered to be drought-sensitive. Potato growing in the agro-ecology environment of the country is believed as little risky for dry farming, but weather change during the last years' requests to be reassessed the circumstances. Especially, the coincidence of hot weather frequency and rainfall shortage in July with potato tuber bulking causes the downed harvest. This trial conducted to reveal potato plant tolerant to water stress, including 6 more common varieties. The varieties were grown in non-stressed and 15 days water limitation conditions. There was revealed that potato growing in the non-stressed condition provided to harvest 6.0 t/ha or 15.6 per cent higher yield than with water limitation treatment.

KEY WORDS: potato, variety, harvest, stress, drought

BACKGROUND

Moisture deficient sensitive crops, like potatoes are more exposed to the global weather change effects.

Weather change stress on crop development has been become visible late 1990s in Mongolia, confirmation the increase by 2⁰C the absolute air temperature, especially hotness of the weather between June and August in 2002 and 2005 was abnormal high for the latest 30 years. Main weather change features recently are rainfall shortages, average daily temperature fluctuation rise and short term soil moisture evaporation. June and July hot and dry

weather influence dramatically to potato plant development when tuber bulking stage occurs resulting in harvest down. Therefore, drought or abiotic stress tolerant variety is majoring in sustainability of potato harvesting. Definition of drought tolerance of potato varieties are complex and methodological demandable. Previously released varieties were evaluated mostly by harvest sustainability in varied weather condition. But up to date there was not conducted acceptable experiments on drought tolerant definition of potato varieties

MATERIALS AND METHODS

There were taken 6 common spread varieties-early maturing Impala, Solist, Gala, Esprit; middle-Vitara and Vineta. Each of those 120 tubers were grown in non-stressed and 15 days water limitation treated conditions with three replication.

Pre-planting applied sheep manure on plot and watered with 30 l per square m. The varieties were grown under same condition up to tuber initiation stages (until15 July) afterward the part of the plot treated with water limitation for 15 days. Yield determination conducted in accordance with standard methods for potatoes.

RESULTS AND DISCUSSIONS

The varieties provided 40.5-54.7 t/ha or averaged 46.0 t/ha tuber yield under non-stressed condition contrary to 29.5-45.7 t/ha or averaged 39.8 t/ha under water limitation treatment. Moreover, revealed that potato growing in the non-stressed condition provided to harvest 6.0 t/ha or 15,6per cent higher yield than with water limitation. However, short

period water limitation has not allowed to obtain reliable data for yield reduction, on both treatment the tuber yield is relatively higher on family farming field. Tuber yield among the early varieties is ranged noticeable, confirming early maturing varieties more sensible to midseason water shortages than late maturing varieties(fig,-1).

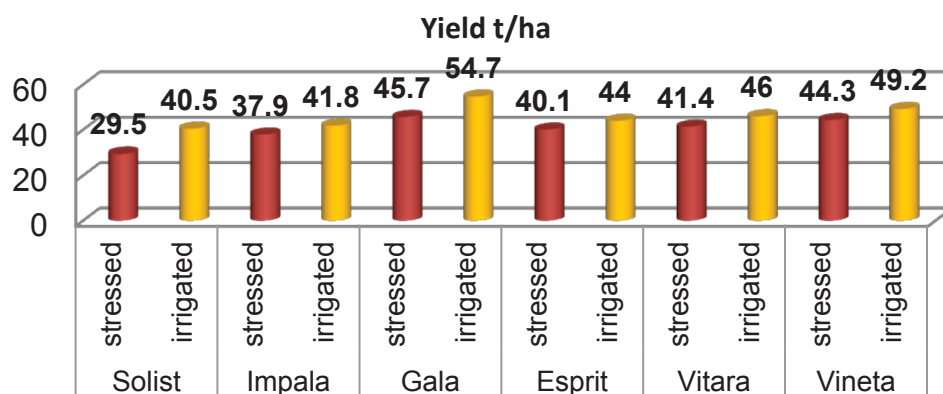


Figure 1.Yield of potato varieties t/ha

Yield and its structure components:Tuber number per a plant, plant yield and tuber weight are main components for yield performance of potato varieties. Found out that potato yield has been correlated highly

($r=0.91-1.0$) with plant tuber weight, middle ($r=0.55-0.75$) with tuber's number and weak($r=0.25$) with an average weight of a tuber (Kh.Nyamgerel, 2009).

Table 1

Varieties	Plant yield, grams		Average, tuber yield,grams		Standard yield, %		Num. of main stem	
	Stressed	irrigated	Stressed	irrigated	Stressed	irrigated	Stressed	irrigated
Solist	737	1013	74	96	91	97	5.5	3.1
Impala	947	1046	123	92	98	96	2.5	3.1
Gala	1143	1368	64	68	94	93	6.1	5.6
Esperit	1003	1101	102	111	96	97	2.1	1.9
Vitara	1036	1150	95	98	96	97	4	3.6
Vineta	1107	1230	101	132	96	98	3.9	3.1
Average	996	1151	93	100	95	96	4.0	3.4

Number of tubers per plant ranged between 9.9-20.1 or averaged 12.5 under irrigation what is not exceeded remarkably than under stressed

plots. Also short time water limitation did not reduce the number of main stems, but among the varieties can be differed their numbers.

DISCUSSION

Development or selection new varieties tolerant to abiotic stress is challenging potato farming in

Mongolia. Additionally, to be needed more accurate study on drought tolerance of potato plants.

CONCLUSION

Short time midseason water limitations lead to reduce potato harvest. Could be more sensitive

the early maturing to water shortages.

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