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Constitution, multiplication and supply of 9 different international nurseries and trials consisting of 432 new genotypes and maintenance of their seed health to provide clean and disease-free barley germplasm to partners in 32 countries globally

ANNUAL REPORT

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Introduction

ICARDA has the global mandate for barley improvement within the Consultative Group of International Agricultural Research (CGIAR). ICARDA's Barley project develops nurseries for a wide range of agricultural systems and distributes them worldwide upon request. The Latin American program was relocated to ICARDA Headquarters in 2008 and the former nurseries for the region are distributed as for High Input (HI) environments. From 2011, ICARDA Barley Program has gone into significant change in strategy and methodology and now there are three different breeding programs operating separately but interconnected. Therefore, all barley nurseries are now developed, prepared and dispatched from Headquarters in Lebanon, except winter and disease screening barely nurseries from ICARDA, Turkey.

- Global Spring Barley Yield Trial (GSBYT) and Global Spring Barley Observation Nursery (GSBON). Since rainfed areas expands in all continents and has global reach, it was decided to name the two above nurseries which would have global distribution. The Yield Trial would constitute 25 lines including local checks and would be represented by the highest yielding lines from ICARDA's Breeding Program. The Observation Nursery would have approximately 150 lines from ICARDA's Low Input Breeding Program. It is suggested that the NARS Co-operators grow the Yield Trials which would have 2 replicates with 6 rows and 2.5 meters long plot. Local modifications however would be required according to the local practices. The Observation Nursery could be adjusted into 2 rows of 2.5 meter plot.

- The International Barley Yield Trial (IBYT-HI) and Observation Nursery (IBON-HI) for High Input (HI) are targeted for areas where barley is grown under more favorable conditions and with the use of near-optimum level of inputs.

- The International Winter Barley Yield Trial (IBYT-W) and Observation Nursery (IBON-W) are targeted for high elevation areas or continental areas with severe winters. These materials require vernalization. Therefore, they are adapted to both low and moderate rainfall areas with cold winters ranging from -5°C to -25°C, but not suitable for the mild-winter lowland areas and tropical high altitude areas, or for spring planting. The International Winter Barley Trial and Nursery will be dispatched from Turkey.

- International Special Nurseries. This category includes special nurseries composed for naked (hull less) barley genotypes. The International Naked Barley Yield Trial (INBYT) and International Naked Barley Observation Nursery (INBON) consist of huskless barley material targeted to be used as food. It is suggested that the NARS Co-operators grow the Yield Trial which would have 2 replicates with 6 rows and 2.5 meters long plots. Local modifications would be required according to the local practices. The Observation Nursery could be adjusted into 2 rows of 2.5 meters long plots.

- International Spring Barley Disease Screening Nursery (ISBDSN), which will include the germplasm and advanced lines with the purpose to have global screening for different diseases and subsequently make them available to NARS for utilization as identified sources of resistance/tolerance to different biotic stresses.

2. Activities and deliverables

1. *Seed Multiplication and International Nurseries*: In 2015/16 cropping season, a total of 4 metric tons of seed from 410 genotypes covering about one hectare of land have been produced with a 6.4 tons of average yield/ha. The crop has been inspected in the field and in the laboratory by the quarantine monitoring and clearance authorities in Lebanon and approved for distribution to co-operators globally (Table1)

Table 1. Number of genotypes, net harvested areas (ha) and quality seed produced for 2017/18 international nurseries distribution

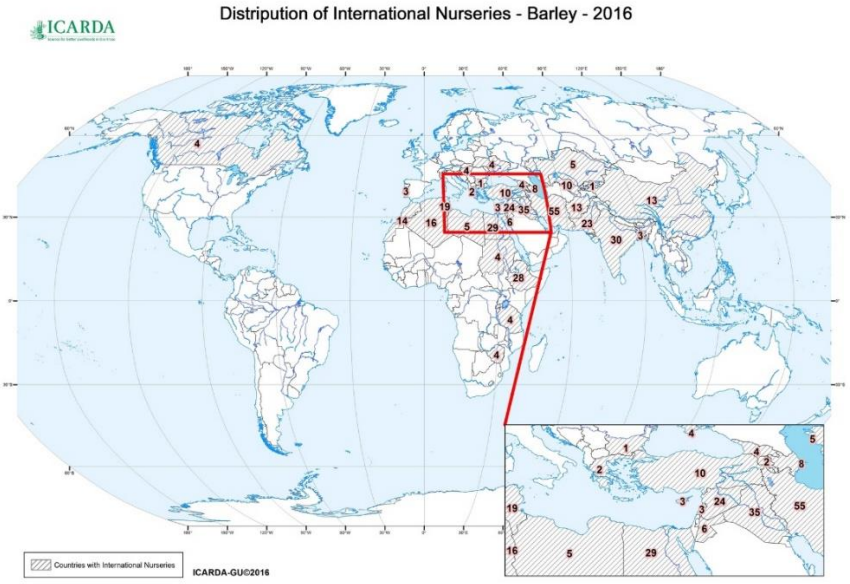
Crops	Number of plots	Area (ha)	Total (T)	Mean yield (T/ha)	Irrigation (mm)
Barley	410	0.63	4.0	6.4	3 X 40)

2. *Distribution of International Nurseries*: In 2016, a total of 432 sets of IN from Nine nurseries comprising 432 genotypes of low input, high input, winter hardy and disease screening nurseries of barley have been distributed to 80 co-operators in 32 countries (Table 2 and Fig.1)

Table 2. Crops, international nurseries trials distributed and beneficiary countries for 2016/17

Crops	Trials	Countries	Cooperators	Sets
Low input barley	GSBYT 4th	24	33	69
	GSBSN 4th	19	26	52
Subtotal low input barley		**24**	**36**	**121**
High input barley	IBYT-HI	25	32	55
	INBYT-HI	22	32	52
	IBON-HI	21	30	51
	INBON-HI	21	30	45
Subtotal High input barley		**29**	**30**	**203**
Winter barley	WBION	14	30	24
	WBIYT	19	30	38
Subtotal Winter barley		**19**	**25**	**62**
Barley disease nursery	3rd-ISBDSN-17	22	26	46
Subtotal barley disease nursery		**22**	**26**	**46**
Grand total Barley		**32**	**80**	**432**

Figure 1. International nursery distribution map for 2016



3. Data recovery, compilation and sharing: All the data on the performance of the barley genotype supplied and shared by the co-operators from 1996 to 2015 is kept in the online International Nurseries Data Management system (INDMS) accessible through the link: http://indms.icarda.org/Home