RESEARCH PROGRAM ON Livestock

CGIAR

ICARDA

Science for resilient livelihoods in dry areas

Technical Progress Report

Unlocking the Potential of Grass pea for Resilient Agriculture in Dry Environments (UPGRADE)

Reporting Period: June 2019 - Dec. 2020

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ICARDA in partnership with the John Innes Centre and the Ethiopian Institute of Agricultural Research has carried out various experiments envisaged in the work packages of the project entitled **"Unlocking the Potential of Grass pea for Resilient Agriculture in Dry Environments (UPGRADE)".** This report covers activities implemented by ICARDA under WP1 and WP2 during the period June 2019 – Dec. 2020.

WP1: Introgress low ODAP trait into locally adapted varieties through marker assisted selection

The main objective of this WP was to introgress low ODAP traits available within ICARDA grass pea germplasm into locally adapted materials. Accordingly, the project team made 13 crosses successfully between low and high ODAP lines during 2020 crop season in Terbol-Lebanon and Rabat-Morocco (Table 1). In addition, the project team advanced 5 F_1 populations to F3 generation under cages to make selection for low ODAP concentration in the background of locally adapted Wassie and Mahateora varieties (Table 2).

Table 1: List of successful F1 hybrids of grass pea made during 2020

Cross number	Female	Cross	Male
ICBG2020-010	Mahateora	x	1874-11
ICBG2020-013	Wasie	x	1548-3
ICBG2020-003	LS007	x	3720-9
ICBG2020-011	Mahateora	x	3720-9
ICBG2020-016	Wassie	x	4884-2
ICBG2020-008	LSWT11	x	4884-2
ICBG2020-015	Wassie	x	3720-9
ICBG2020-014	Wassie	x	1874-11
ICBG2020-004	LS007	x	4884-2
ICBG2020-002	LS007	x	1874-11
ICBG2020-001	LS007	x	1548-3
ICBG2020-007	LSWT11	x	3720-9
ICBG2020-006	LSWT11	x	1874-11

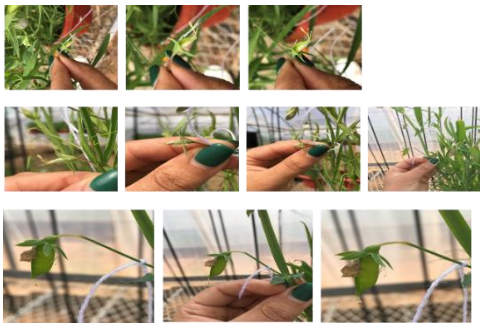

Table 2. F3 populations of grass pea crosses advanced during 2020

PLOT_NO	DESIGNATION	CROSS	Reason	No. of lines
1	IGC-2012-2	Prateek x B222	ODAP	180
2	IGC-2012-4	Prateek x 288	ODAP	180
3	IGC-2012-6	1904 x 1916	Seed size	160
4	IGC-2012-24	1330 x 2125	Crop duration	115
5	IGC-2012-31	Ratan x 2125	Crop duration	141
6	IGC-2012-73	Ratan x IG135481	ODAP	90
7	IGC-2012-76	Prateek x IG 135481	ODAP	141
8	IGC-2012-78	(385x 2329) x IGC 2011-61	ODAP	200

In addition, seeds of 8 RIL populations were multiplied under cages in Terbol, Lebanon. Observations on flower colour, plant height, days to maturity and seed colour were recorded (Table 3).

Table 3. Seed multiplication of RIL populations of grass pea for ODAP analysis and phenology

F3(x2019)	ICBG2019-009	Mahateorax1548-3
F3(x2019)	ICBG2019-010	Mahateorax1874-11
F3(x2019)	ICBG2019-012	Mahateorax4884-2
F3(x2019)	ICBG2019-014	Wassiex1874-11
F3(x2019)	ICBG2019-016	Wassiex4884-2

The UPGRADE activities under WP 1 and 2 are progressing very well where data were collected on performance of grass pea both under abiotic and biotic stresses. The analysis of various pot and plot experiments and laboratory analysis of ODAP content will provide the opportunities to develop grass pea lines with low ODAP content. Some of these results will be reported in the next report.