

# ADER 1.1.7

rain legumes: spring peas, autumn peas, soybeans and chickpeas



perennial fodder legumes: alfalfa, red clover

*Maximizing plant protein yields and increasing contribution of atmospheric nitrogen fixation optimization of rotations by creating legumes more productive grains and fodder, with improved heat and water stress tolerance and disease, suitable for mechanized harvesting and superior qualities various uses*

**Project coordinator:** National Agricultural Research and Development Institute Fundulea

**Project partners:** 4

Agricultural Research and Development Station Turda Agricultural Research and Development Station Livada

Agricultural Research and Development Station Teleorman

Agricultural Research and Development Station Simnic

The period of project: 2015-2018 (38 months);

Total value 2015-2018: 912.850 lei

- 2015 = 200.350

- 2016-2018 = 237.500/year

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## **THE GENERAL OBJECTIVES OF THE PROJECT**

*Creation of new inbreed lines/varieties for legumes grain (autumn and spring peas, soybeans and chick peas) and fodder legumes (alfalfa and red clover) to register in S.I.V.T.R.'s network at least one variety or line/species/breeding center, with a minimum increase of 3% compared to control varieties;*

- creation of new varieties of alfalfa, red clover, soybeans, peas and chickpea with a high degree of genetic tolerance to drought and heat;*
- improving the resistance to low temperatures (red clover, alfalfa and autumn pea), disease and quality for nutritional/fodder increase;*
- creation of varieties of peas suitable for the "green crop" program;*
- creation of alfalfa and red clover varieties with superior persistence to the current genotypes, competitive in mixtures with annual legumes and annual and perennial grasses and peas competitively mixed with triticale for the production of grains or forage (autumn mixture) or mixed with grain oats or forage (spring mixture).*

**Fodder yield achieved by new alfalfa varieties in field trials  
in the 2nd and 3rd years of vegetation (2015-2016) at NARDI Fundulea  
1 st test cycle**

No.	Variety	Fodder yield				Dry matter yield			
		2015	2016	t/ha	%	2015	2016	t/ha	%
1	F 2312-14	67,3	74,1	70,7	106,1	15,6	17,8	16,7	105
2	F 2313-14	64,9	75,0	70,0	105,0	15,31	17,8	16,6	104
3	F 2308-14	63,6	73,6	68,6	102,9	15,2	17,8	16,5	104
4	F 2309-14	63,2	74,6	68,9	103,4	14,7	18,0	16,4	103
5	TEODORA	64,4	72,2	68,3	102,5	15,2	17,4	16,3	103
6	CEZARA	65,2	73	69,1	103,7	15,2	17,3	16,3	102
7	F 2306-14	61,8	74,5	68,2	102,3	14,6	17,8	16,2	102
8	F 2310-14	61,2	73,5	67,4	101,1	14,4	17,4	15,9	100
9	DANIELA (Ch.)	63,1	70,2	66,7	100,0	14,7	16,9	15,8	100
10	F 1918-07	61	71,5	66,3	99,4	14,6	16,8	15,7	99,
11	F 2014-08	57,0	71,7	64,4	96,5	13,7	17,1	15,4	97,
12	MAGNAT	58,9	69,3	64,1	96,2	13,7	16,3	15,0	94,
	Average	62,6	72,8	67,7	101,6	14,8	17,4	16,1	101
	LSD 5%	2,9	2,3	2,6	3,9	0,6	0,6	0,6	3,8

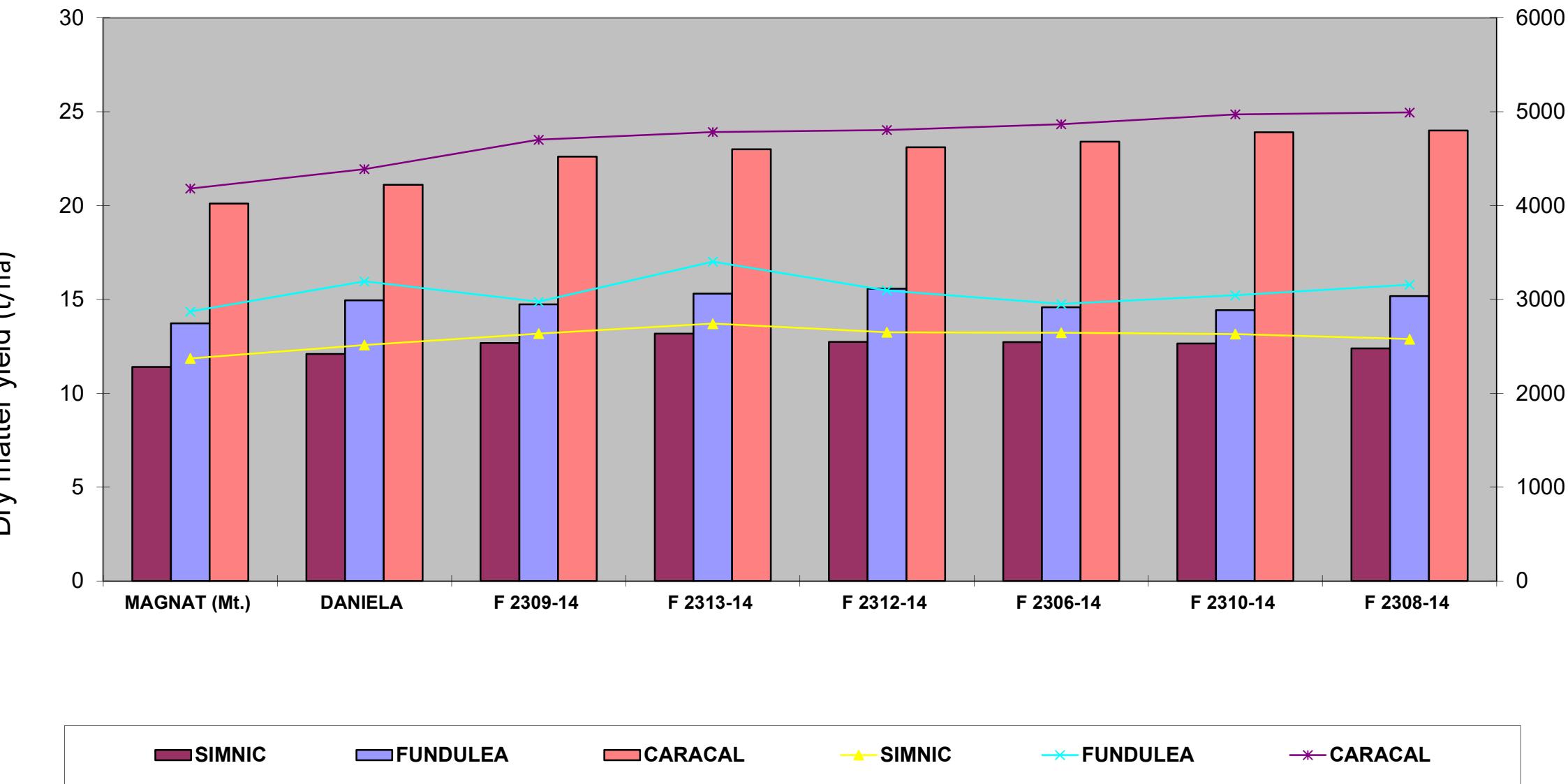
**Fodder yield achieved by new alfalfa varieties in comparative trials  
in the 2nd and 3rd years of vegetation (2015-2016) at ARDS Caracal  
1 st test cycle**

No.	Variety	Fodder yield (t/ha)				Dry matter yield (t/ha)			
		2015	2016	Average	%	2015	2016	Average	%
1	F 2311-14	123,8	109,3	116,6	116,2	24,5	22,8	23,7	121,9
2	F 2315-14	124,0	107,2	115,6	115,3	24,4	22,1	23,3	119,8
3	F 2310-14	120,8	103,8	112,3	112,0	23,9	21,4	22,7	116,8
4	Sandra	121,9	102,7	112,3	112,0	23,9	21,0	22,5	115,7
5	F 2308-14	120,2	100,2	110,2	109,9	24,0	20,8	22,4	115,5
6	F 2306-14	119,7	97,7	108,7	108,4	23,4	20,4	21,9	112,9
7	F 2312-14	118,6	98,5	108,6	108,2	23,1	20,3	21,7	111,9
8	F 2313-14	118,1	98,3	108,2	107,9	23,0	20,4	21,7	111,9
9	F 2309-14	116,7	95,4	106,1	105,7	22,6	19,7	21,2	109,0
10	Mihaela	115,6	94,4	105,0	104,7	22,2	19,5	20,9	107,5
11	Roxana	116,6	91,5	104,1	103,7	22,8	18,4	20,6	106,2
12	Catinca	114,3	92,2	103,3	102,9	22,0	18,7	20,4	104,9
13	Daniela (Ch.)	111,9	88,7	100,3	100,0	21,1	17,7	19,4	100,0
14	Magnat	108,2	88,5	98,4	98,1	20,1	17,9	19,0	97,9
	MEDIA	117,9	97,7	107,8	107,5	22,0	18,9	20,4	105,3

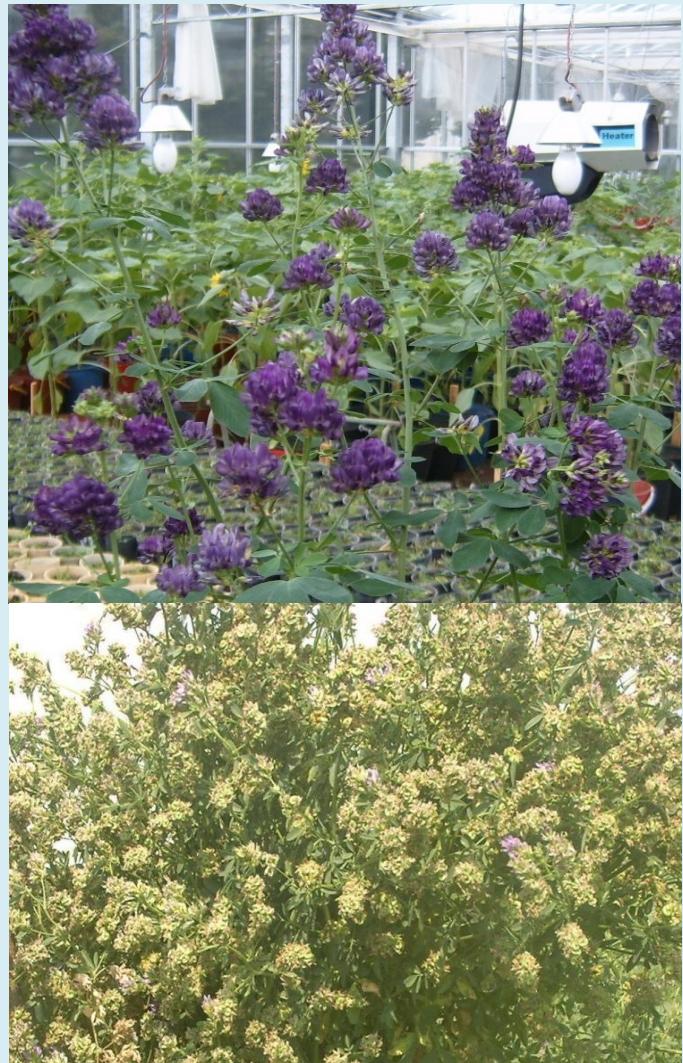
The  
performance of  
new alfalfa  
varieties  
NARDI Fundulea  
Average 2 years  
(2017-2018  
(II<sup>nd</sup>-III<sup>rd</sup> years of  
vegetation)

No.	Variety	Dry matter			
		2017	2018	t/ha	%
1	F 2510-16	15,4	15,8	15,6	1
2	Syn 2 GR-16	15,3	15,7	15,5	1
3	F 2507-16	15,4	15,6	15,5	1
4	F 2512-16	15,5	15,3	15,4	1
5	ILEANA	14,8	15,9	15,4	1
6	F2509-16	15,1	15,6	15,3	1
7	POMPILIA	15,0	15,4	15,2	1
8	F2506-16	15,0	15,3	15,2	1
9	MĂDĂLINA	14,9	15,4	15,1	1
10	LILIANA	14,8	15,4	15,1	1
11	Syn 1 GR-16	14,9	15,3	15,1	1
12	Syn 3 AE-16	15,0	15,1	15,1	1
13	DANIELA (Ch.)	14,4	15,1	14,8	1
AVERAGE		15,0	15,5	15,2	1

# Dry matter yield and crude protein yield of the new alfalfa varieties obtained in the testing network of NARDI Fundulea in 2015

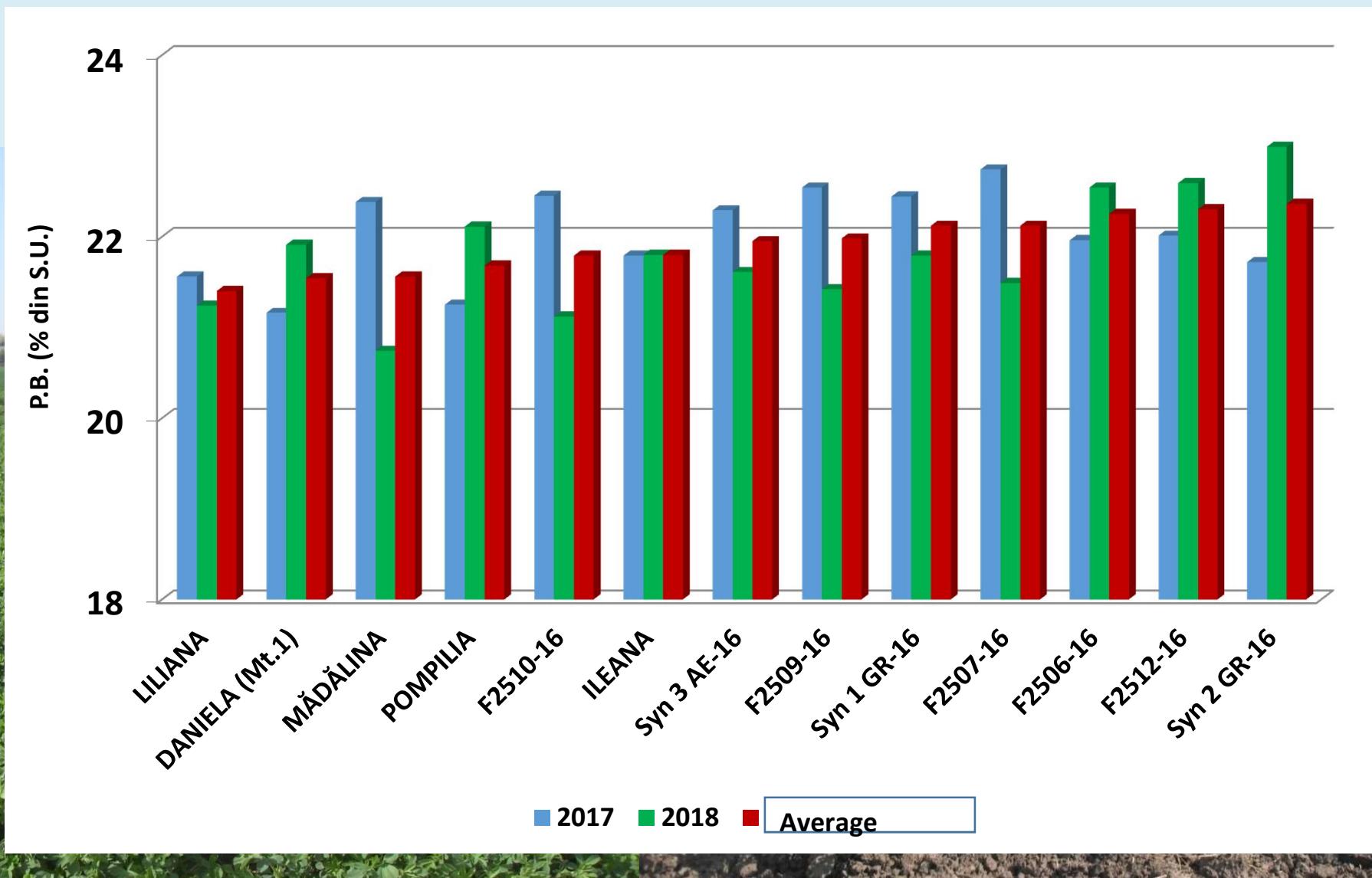


## Seed yield achieved by new alfalfa varieties in I-III years of vegetation, between 2016-2018 at ARDS Simni



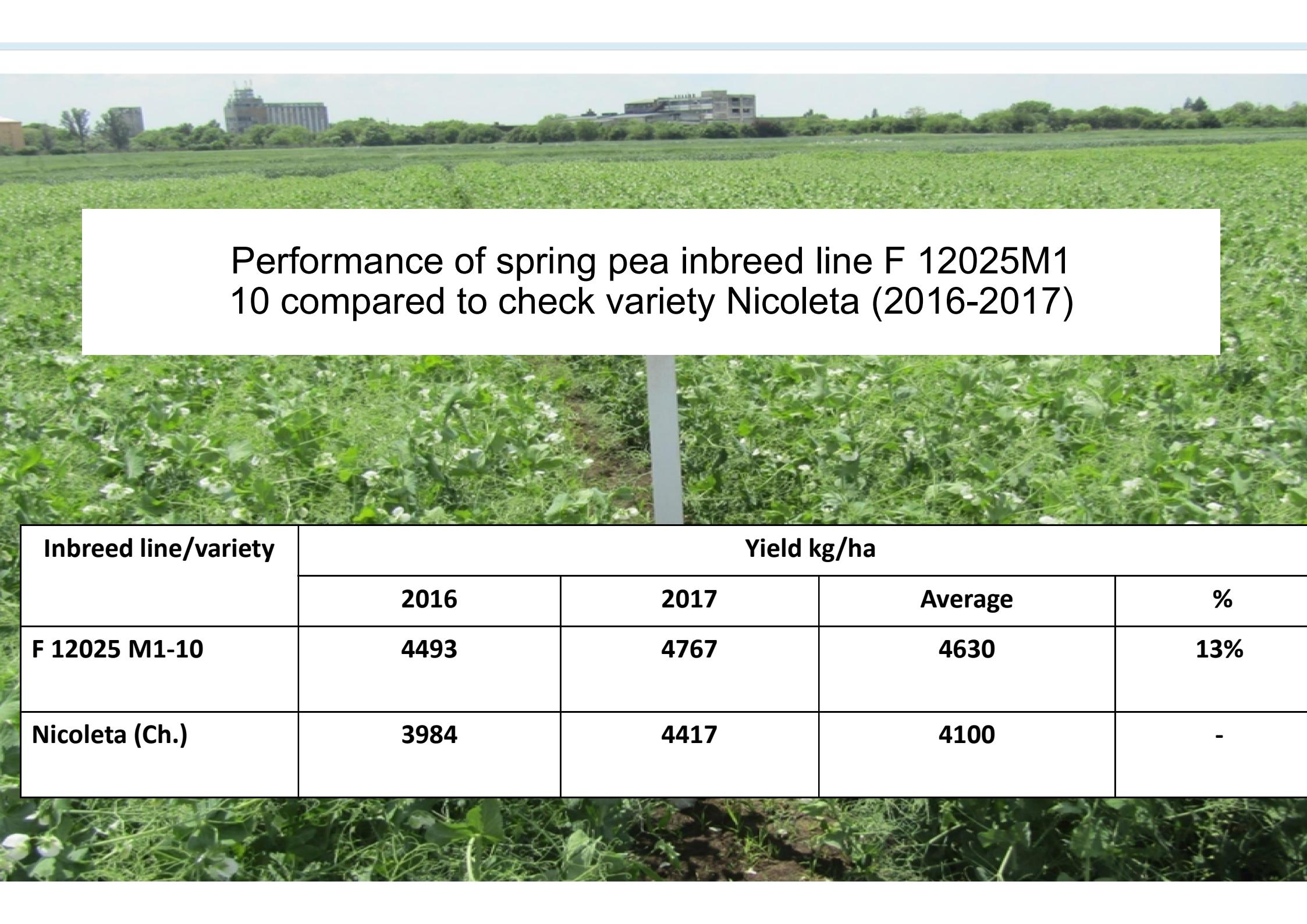
No.	Variety	1st Year	2nd Year	3rd Year	Average	
		2016	2017	2018	kg/ha	%
<b>1</b>	F 2507 – 16	470	437	488	465	108,5
<b>2</b>	F 2512 – 16	493	429	471	464	108,3
<b>3</b>	POMPILIA	486	414	468	456	106,4
<b>4</b>	F 2510 – 16	474	421	463	453	105,6
<b>5</b>	F 2506 – 16	469	416	472	452	105,5
<b>6</b>	ILEANA	488	411	449	449	104,8
<b>7</b>	F 2509 – 16	482	409	446	446	104,0
<b>8</b>	LILIANA	473	409	451	444	103,7
<b>9</b>	Daniela (Ch.)	<b>425</b>	<b>404</b>	<b>457</b>	<b>429</b>	<b>100,0</b>
<b>10</b>	Madalina	449	382	441	424	98,9
<b>11</b>	Magnat	416	375	422	404	94,3
<b>12</b>	Syn 3 AE - 16	411	366	382	386	90,1
<b>13</b>	Syn 1 GR - 16	404	361	386	384	89,5
<b>14</b>	Syn 2 GR – 16	414	349	377	380	88,6
	<b>Average</b>	<b>454</b>	<b>399</b>	<b>441</b>	<b>431</b>	<b>101</b>

## Variability regarding crude protein content of new alfalfa varieties between 2017-2018 at NARDI Fundulea





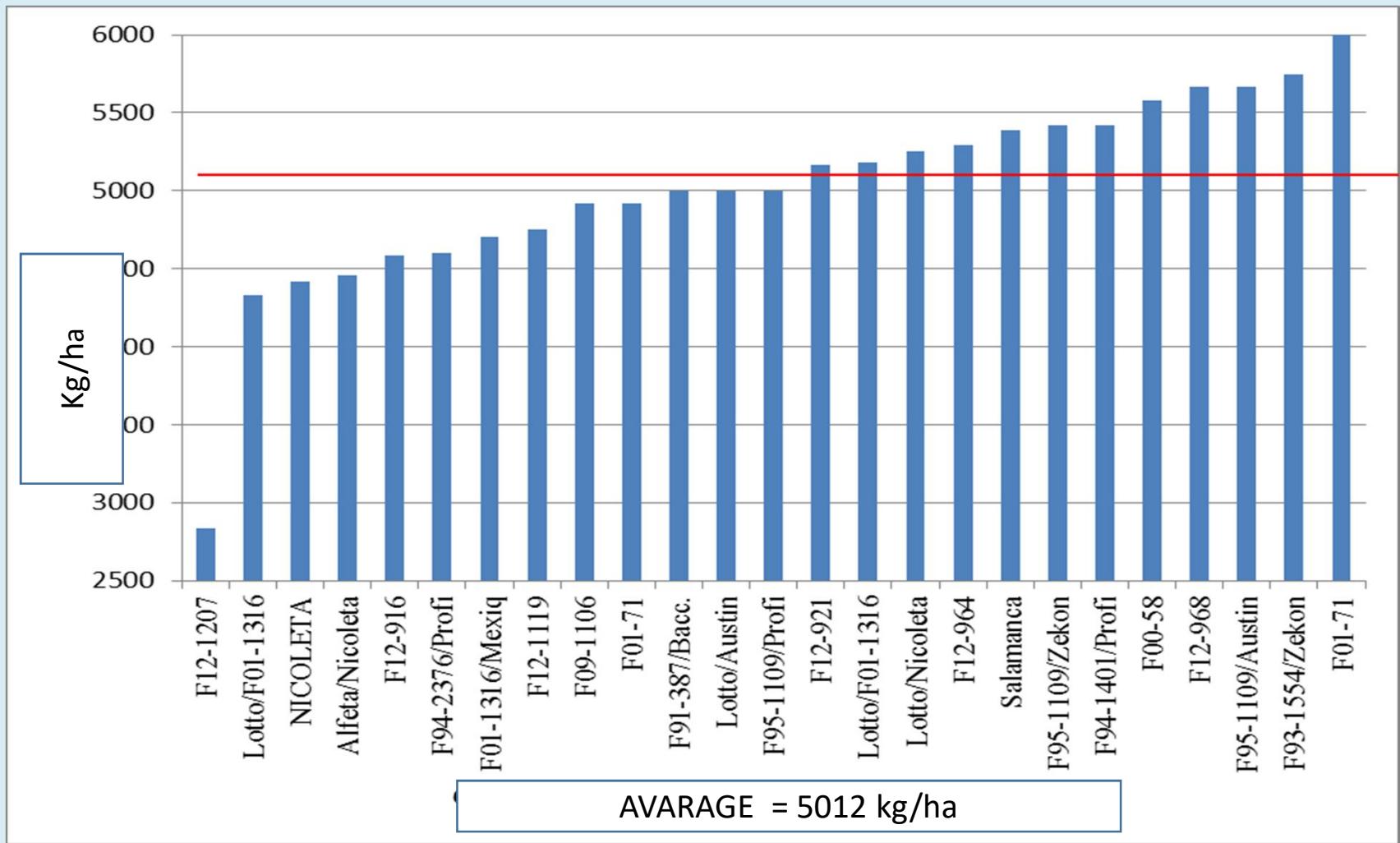
LILIANA  
Seed multiplication plot



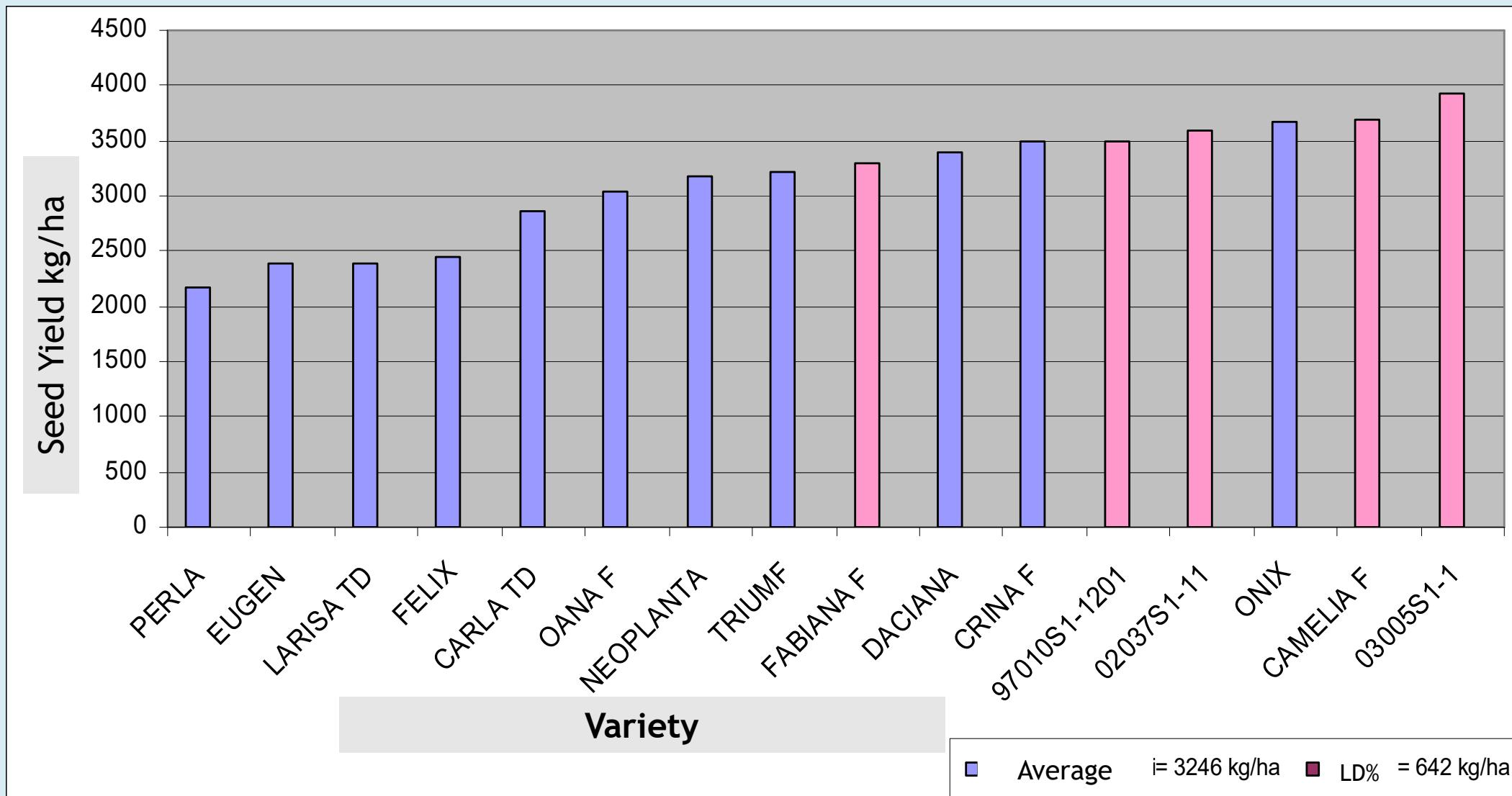
## Performance of spring pea inbreed line F 12025M1 10 compared to check variety Nicoleta (2016-2017)

Inbreed line/variety	Yield kg/ha				%
	2016	2017	Average		
F 12025 M1-10	4493	4767	4630		13%
Nicoleta (Ch.)	3984	4417	4100		-

# Performance of spring pea inbreed lines developed between 2016-2018



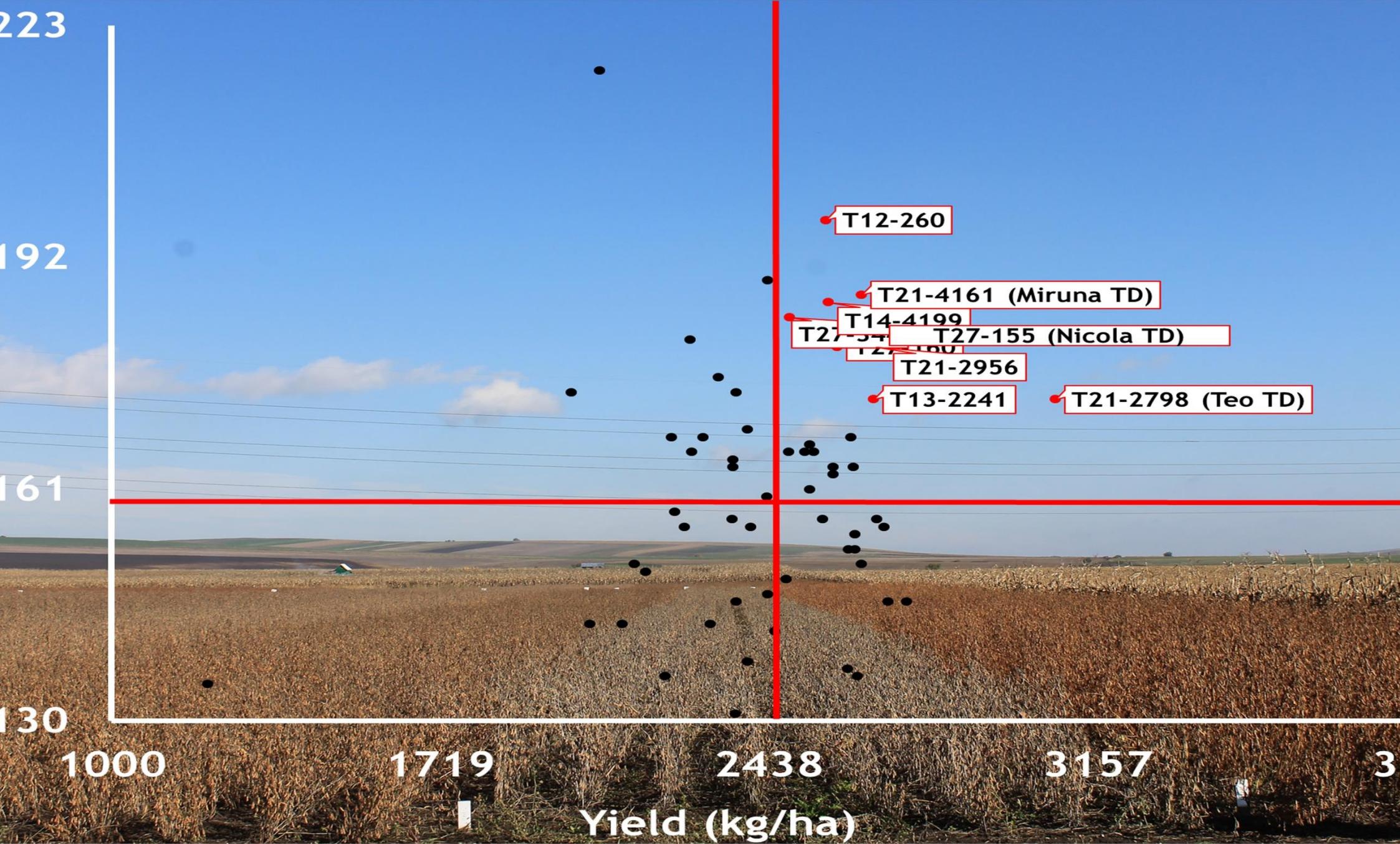
## Grain yields obtained from the main soybean genotypes tested at Fundulea



oybean early genotypes analyzed in the ADER 117 project with the highest yields (Turda, 2015-2018)

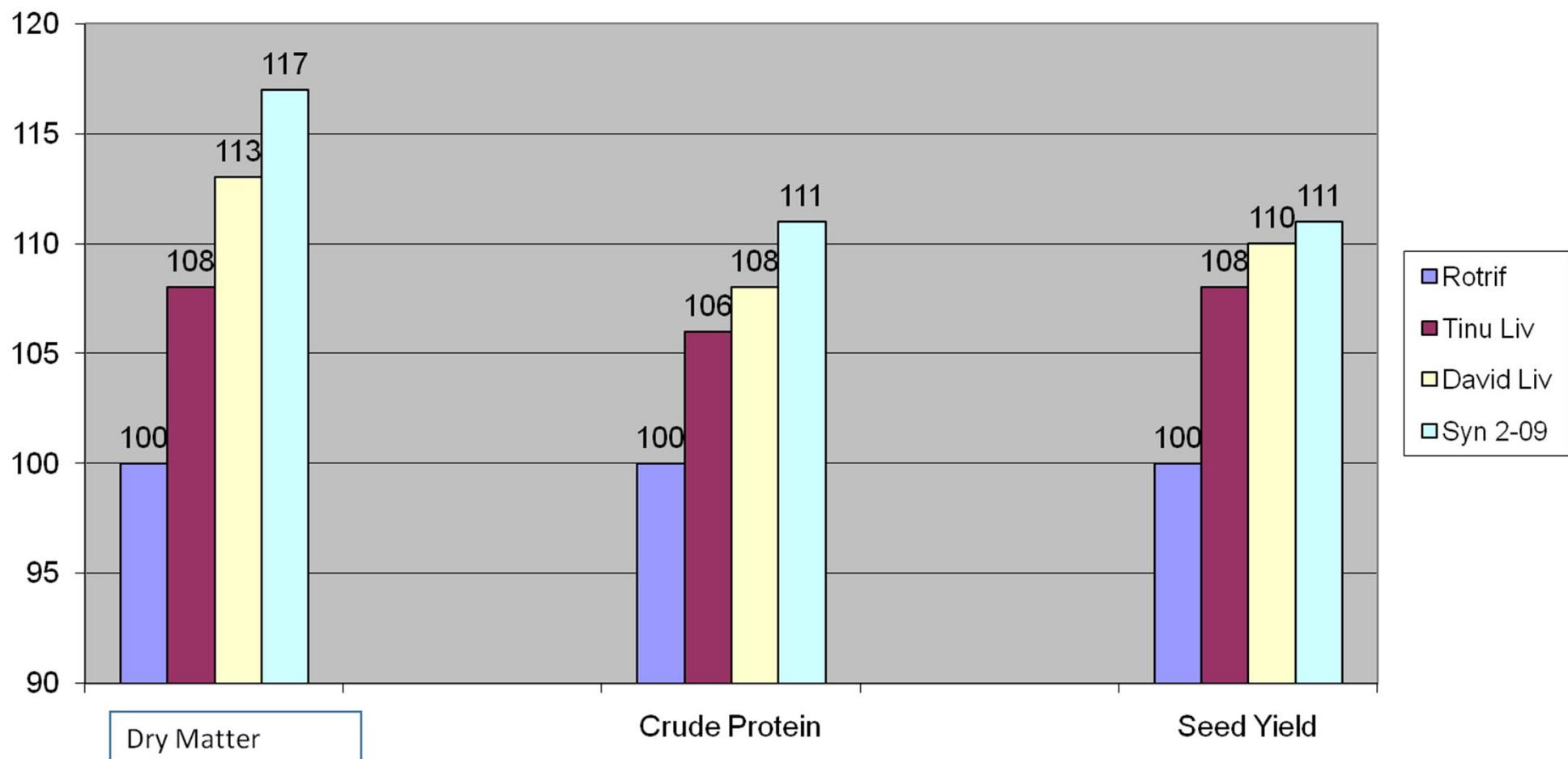
Variety	Yield(kg/ha)	TKW (g)	No.	Variety	Yield(kg/ha)
Check: Onix created at ARDS Turda (GM 00) = 2451 kg /ha					
T21-2798 (Teo TD)	3065	173	11.	T27-179	2632
T27-155 (Nicola TD)	2790	181	12.	T21-2847	2627
T28-817	2740	146	13.	T13-2251	2627
T10-3157	2699	146	14.	T14-4053	2622
T23-5303 (Felicia TD)	2690	156	15.	T12-301	2617
T27-1	2674	157	16.	T12-252	2612
T21-2956	2674	180	17.	T23-5607	2611
T13-2241	2668	173	18.	T27-160	2588
T21-4161 (Miruna TD)	2641	187	19.	T23-5026	2579
T21-2728	2640	151	20.	T26-6126	2578

## Soybean genotypes with high TKW and also yield, (Turda, 2015-2018)





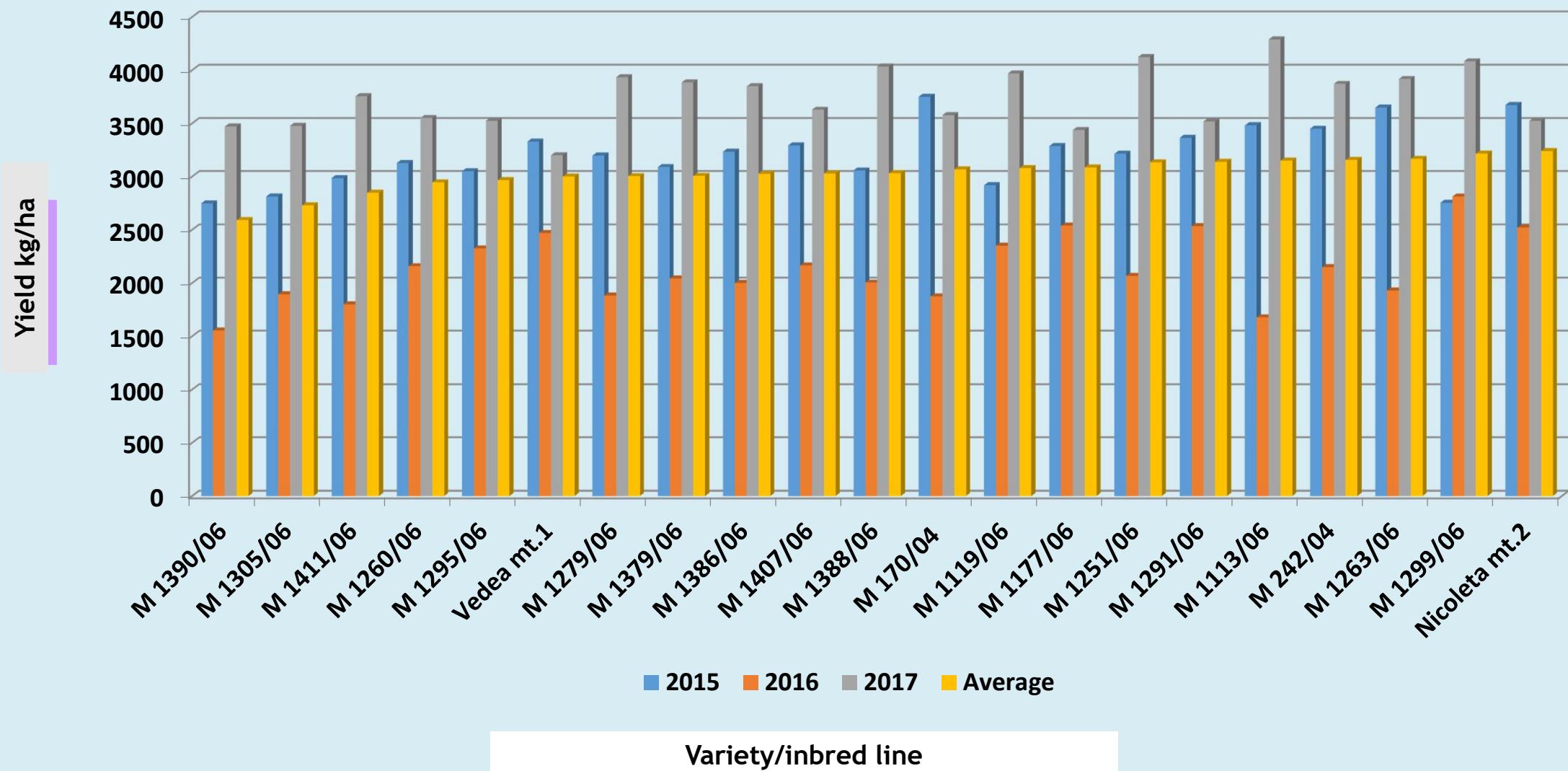
# The genetic progress achieved in red clover breeding at ARDS Livad



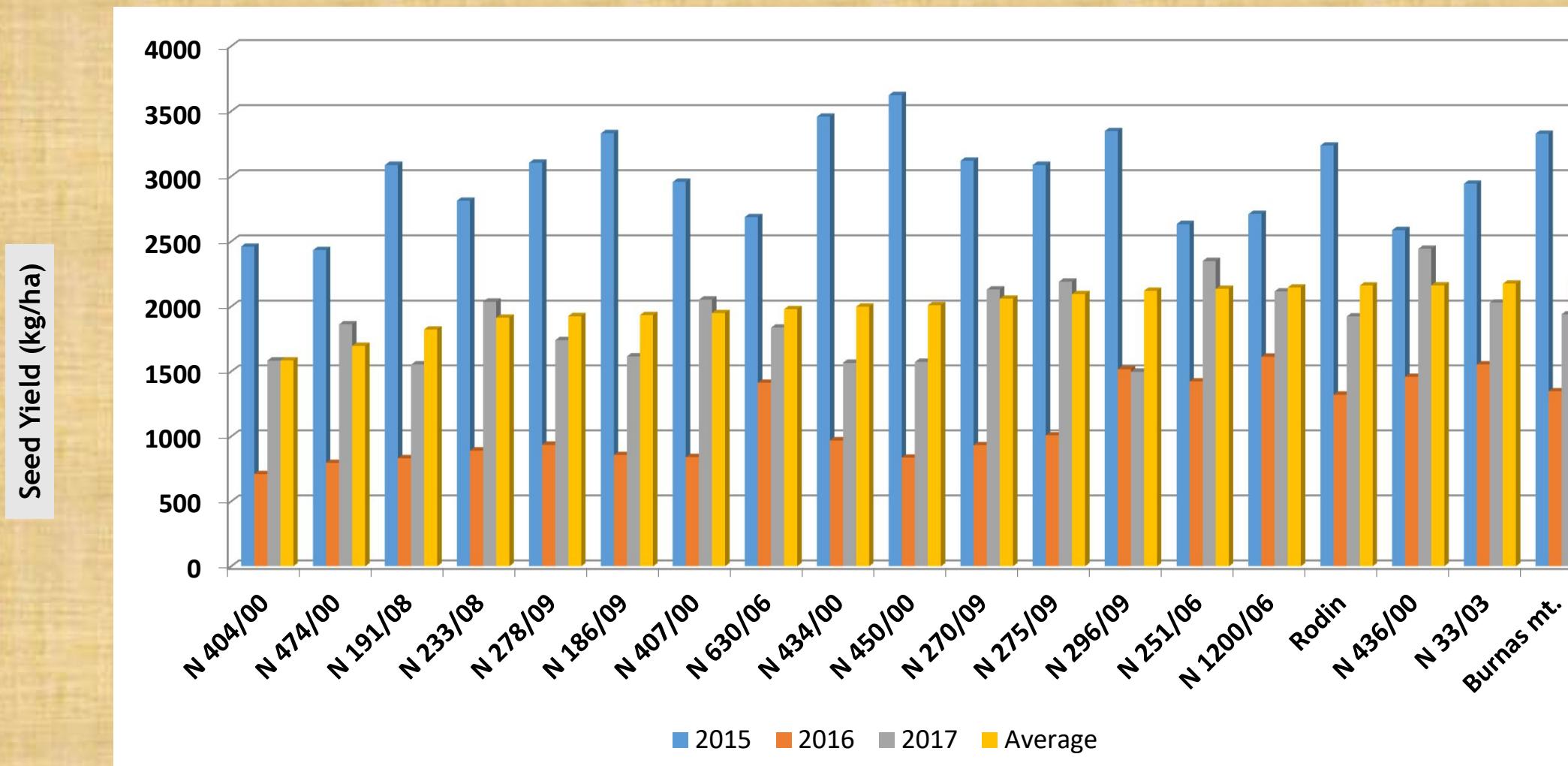
## Seed production achieved by red clover varieties at SCDA Livada between 2015-2018

No.	Variety	Seed yield kg/ha				Average	±	%
		2015	2016	2017	2018			
1	Sătmărean -4n	417	347	395	316	369	-156 <sup>ooo</sup>	70
2	Livada Sara-2n	620	603	544	498	566	41**	108
3	Livada Ralu-2n	620	543	529	492	546	21	104
4	Marga Liv-2n	590	559	528	520	549	24	105
5	Syn5-08 (David Liv)-2n	600	602	566	540	577	52***	110
6	Syn6-08 (Tinu Liv)-2n	613	587	547	520	567	42**	108
7	Syn 1-09-2n	603	594	532	519	562	37**	107
8	Syn 2-09-2n	620	610	559	543	583	58***	111
9	Rotrif(Ch.)-2n	560	542	510	488	525	0	100
	<b>Average</b>	<b>583</b>	<b>554</b>	<b>523</b>	<b>493</b>	<b>538</b>	<b>13</b>	<b>103</b>
	<b>LSD 5%</b>	<b>24</b>	<b>38</b>	<b>22</b>	<b>30</b>	<b>26</b>		

# Seed yield of pea genotypes tested in field trials at ARDS Teleorman between 2015-2017



## Seedyield for Chickpea tested in field trials at ARDS Teleorman, between 2015-2017



## CONCLUZII

The climatic conditions of the years 2017-2018, characterized by a quantity of rainfall over the multiannual average, but very unevenly distributed, influenced the yield.

The accumulation of biomass and, respectively, the level of production at newly created genotypes was in close dependence not only with the degree of supply of soil with water in the vegetation period, but also with the reserve of soil water accumulated in winter, which had a positive influence, particularly for perennial fodder plants decreasing the effects of drought on the experiences from the II<sub>nd</sub>-III<sub>rd</sub> years of vegetation;

## FINAL OBJECTIVE

- Releasing in S.I.V.T.R.'s network at least 1 variety/species/breeding center;

**IMPLEMENTED OBJECTIVE:** there have been released 12 varieties:

1- PROJECT COORDINATOR NARDI Fundulea:

- *5 pea inbred lines (F00-78, F11-1189, F05-28, F10-1807, F12-1207);*
- *one soy inbred line, F 03005S1;*
- *one alfalfa variety, F 2323-14;*

2 - PARTNER 1- ARDS Turda:

- *2 soybean inbred lines (T10-3157 , T12-252);*

3 - PARTNER 2- ARDS Livada:

- *one red clover variety , Syn 2-09;*

4 - PARTNER 3 -ARDS Teleorman:

- 1 pea inbred line M 1113 and one chickpea line N 462-1.*

## Variety patent

During this project, five varieties were patented: two red clover varieties(David Liv and Tinu Liv), two pea varieties (Rodica and Telma), one soybean variety (ADA TD).

## RESULTS DISSEMINATION

SPECIFICATION	City/explanations	SPECIFICATION	No.
<b>DEMO PLOTS FIELD DAYS</b>	<b>NARDI Fundulea, ARDS Turda, ARDS Livada, Agricost Braila, Agrichim Fetesti</b>	<b>Workshops, Conferences</b>	<b>13</b>
<b>AGRIPLANTA</b>	<b>Fundulea, pea, soybean, alfalfa</b>	<b>Scientifical papers</b>	<b>11</b>
<b>LEAFLETS</b>	<b>500 copies</b>	<b>Popularization papers</b>	<b>8</b>

**It has been produced seed from new lines and varieties, differentiated by species according to the multiplication ration.**