PRELIMINARY ANTECEDENT OF TOLERANCE TO *COLLETOTRICHUM LUPINI*

Erik von Baer

Semillas Baer, Casilla 87 Temuco-Chile

Corresponding author's email: info@semillasbaer.cl

ABSTRACT

During the season 2005-2006 and 2006-2007, a test of tolerance to anthracnose was carried out in Gorbea, southern of Chile, in this test the susceptible variety AMIGA was used as an infection source for inoculum. Among germoplasm analysed are Australian material with antecedent of resistance (Andromeda, WALAB2008), P27174 (Ethiopian resistant parent), Ukrainian, Belarus and lines from Azores. The scale of tolerance was from 1 without damage, to 9 totally destroyed.

KEYWORDS

anthracnose tolerance, climate conditions

INTRODUCTION

It has been very difficult to test the relative resistance or tolerance to Anthracnose (*Colletotrichum lupini*), under field conditions in consecutive years. The main reason for this has been climatic variation, where temperature and humidity determine the aggressiveness of the pathogen, according to Weimer (1943). Another possible reason in case of winter lupins is the damage from frost during nights and high temperatures with high humidity during the day, which facilitates the penetration of the pathogen into the plants, as happens in winter sowings in Brazil, according to Baier and Linhares, 1990. In addition, according to von Baer *et al.* (1999), tolerance could be also explained by the concentration of phenols in the plant during the moment of the attack, at the most susceptible growth stage between the state of rosette and beginning of flowering. All this becomes even more complex after the identification of different races of the pathogen using molecular markers, which are possibly active under different conditions of climate and to which the different selections and varieties react in different way, as demonstrated by Véliz D. *et al.* (2005). In order to find relationships among these factors under field conditions the following Anthracnose screening experiment was performed in *L. albus*.

MATERIALS AND METHODS

During seasons 2005-06 and 2006-07, a collection of 102 line and varieties of Spring *Lupinus albus* with antecedents of resistance in previous years or new material introductions were sown in Gorbea, southern of Chile (latitude length, 95 mts above see level), on July 27th. Importantly, the phenology of the germplasm was similar throughout, to prevent disease escape through late flowering. (Previous observations had demonstrated that when comparing material with different flowering and maturity, often the late ones were not attacked.) All seeds were treated with Vitavax® [Formulation: carboxin 200 g/L, Thiram 200 g/L] (250 gr/100 kg).

Seeds were sown in twin rows of 5 metres with 0.2 metres between rows, with a density of 50 seeds by row (= 10 seeds by linear metre). In order to obtain a strong and uniform infection, two rows of the susceptible variety Amiga were sown across the test rows without any disinfection treatment. Amiga had a similar and strong infection in all of the cross rows, which allowed a homogeneous infection through all testing lines rows. Infection started in the area close to the untreated Amiga variety plants and the infection then propagated through the testing rows.

The evaluation was designed using a scale from 1 to 9, corresponding 1 to without attack and 9 to total damage. The observations were taken from the rosette state to the finish of flowering, including the damage on green pods.

Table 1. Disease scores of the best 11 lines and varieties identified in anthracnose screening experiment 2006-07.

Mark	Nr.	Line or variety	Origin
1	None		
2	126	OXANA 1	Selection of material from Ukraine
2	129	OXANA 2	Selection of material from Ukraine
2	146	341-2	Cross with AZORES 156 and selection
2	163	345-10	Cross with AZORES 156 and selection
2	216	MA-2	Selection of mutant of Belarus
2	221	ANDROMEDA	Australia
3	222	WALAB 2008	Australia
3	140	P27175/89B B04A	Ethiopian resistant parents
4	177	355-4	Cross with AZORES 156 and selection
4	223	P27174	Ethiopian resistant parents

Note: All crossings and later selections were done under conditions of Gorbea, south of Chile.

IN J.A. Palta and J.B. Berger (eds). 2008. 'Lupins for Health and Wealth' Proceedings of the 12th International Lupin Conference, 14-18 Sept. 2008, Fremantle, Western Australia. International Lupin Association, Canterbury, New Zealand. ISBN 0-86476-153-8.

In order to simplify the interpretation of results the most severe disease score was used. The predominant pathogen race in the attack was the one that corresponds to A-2, according Veliz, Ibañez and Riegel, 2005.

RESULTS AND DISCUSSION

The attack of Amiga, corresponded to a score from 7 to 8. All materials suffered some kind of attack, with the lowest disease score being 2 and 3.

In different lines it was observed plants with and without attack, which can signify possible heterozygosis for resistance. None of the varieties or lines selected as the best ones, presented white flowers and stems without antozianinas (phenols).

Germplasm with disease scores between 2 to 3 were sown again in the season 2007-2008, but unfortunately weather conditions did not permit an adequate infection.

CONCLUSIONS

- Apparently, there are different sources of resistance to Anthracnose, based on different origins of the tested material.
- In order to confirm the results, it is important to repeat these observations annually, under different environmental conditions.
- The use of molecular markers, identifying different resistance genes, should allow the determination of possible kinship among lines.
- Molecular assessment can be used to determine if the race of the infection in one year is the same or another one than in other year.
- Determining both the sources of resistance and race of pathogen present would allow examination of relationships that exist between race and resistance.

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