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Introduction

- Sunflower downy mildew (*Plasmopara halstedii* (Farl.) Berl and de Toni) and rust (*Puccinia helianthi* Schwein) are two economically important diseases (1, 2).
- Genetic resistance can be used to manage both diseases.
- In previous work, a disproportionate amount of resistant germplasm has originated from Texas, suggesting evaluation of Texas accessions may be prudent.

Objectives

1. Evaluate the USDA North Central Regional Plant Introduction Station (NCRPIS) collection of wild *Helianthus annuus* and *Helianthus argophyllus* to *P. halstedii* race 734 virulent on *Pl*₆ and *Pl*₇ which are commonly deployed in commercial hybrids (2).
2. Evaluate the most resistant 10 percent of the *H. annuus* and *H. argophyllus* accessions to a composite of *P. halstedii* isolates conferring a virulence phenotype consistent with race 777 in aggregate.
3. Evaluate the USDA NCRPIS collection of wild *H. annuus* and *H. argophyllus* to *P. helianthi* race 336, commonly detected in North Dakota (1).

Materials and Methods

- **Accessions:** 182 *H. annuus* accessions and 33 *H. argophyllus* accessions originating from Texas.
- **Design:** Completely randomized design (CRD) in greenhouse environment with four replicates (downy mildew) and six replicates (rust).
- **Downy mildew pre-screening (734) and post-screening (777):** Inoculate seedlings with zoosporegia and evaluate incidence 11 days post-inoculation.
- **Rust pre-screening:** Inoculate 14 day old plants with urediniospores (race 336) and evaluate infection types 14 days post-inoculation.

Conclusions and Future Work

- High levels of resistance to downy mildew and rust were detected during pre-screenings (Figs. 1a, 1b, 3a, and 3b).
- Six *H. annuus* and two *H. argophyllus* accessions had susceptibility percentages below 20 percent during the downy mildew post-screening (Figs. 2a and 2b).
- Seven *H. annuus* and three *H. argophyllus* accessions had susceptibility percentages below 30 percent in all three screenings (Fig. 4).
- Additional screening to *P. helianthi* race 777 will be done in winter 2015.

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Literature Cited

1. Friskop, A. J. et al. 201X. Plant Disease (Accepted PDIS-11-14-1127-RE).
2. Gulya, T. et al. 2013. Plant Health Progress. Doi:10.1094/PHP2013-022-01-RS.

Results

Figure 1a. Number of *H. annuus* accessions, categorized by percent plants susceptible to *P. halstedii* race 734.

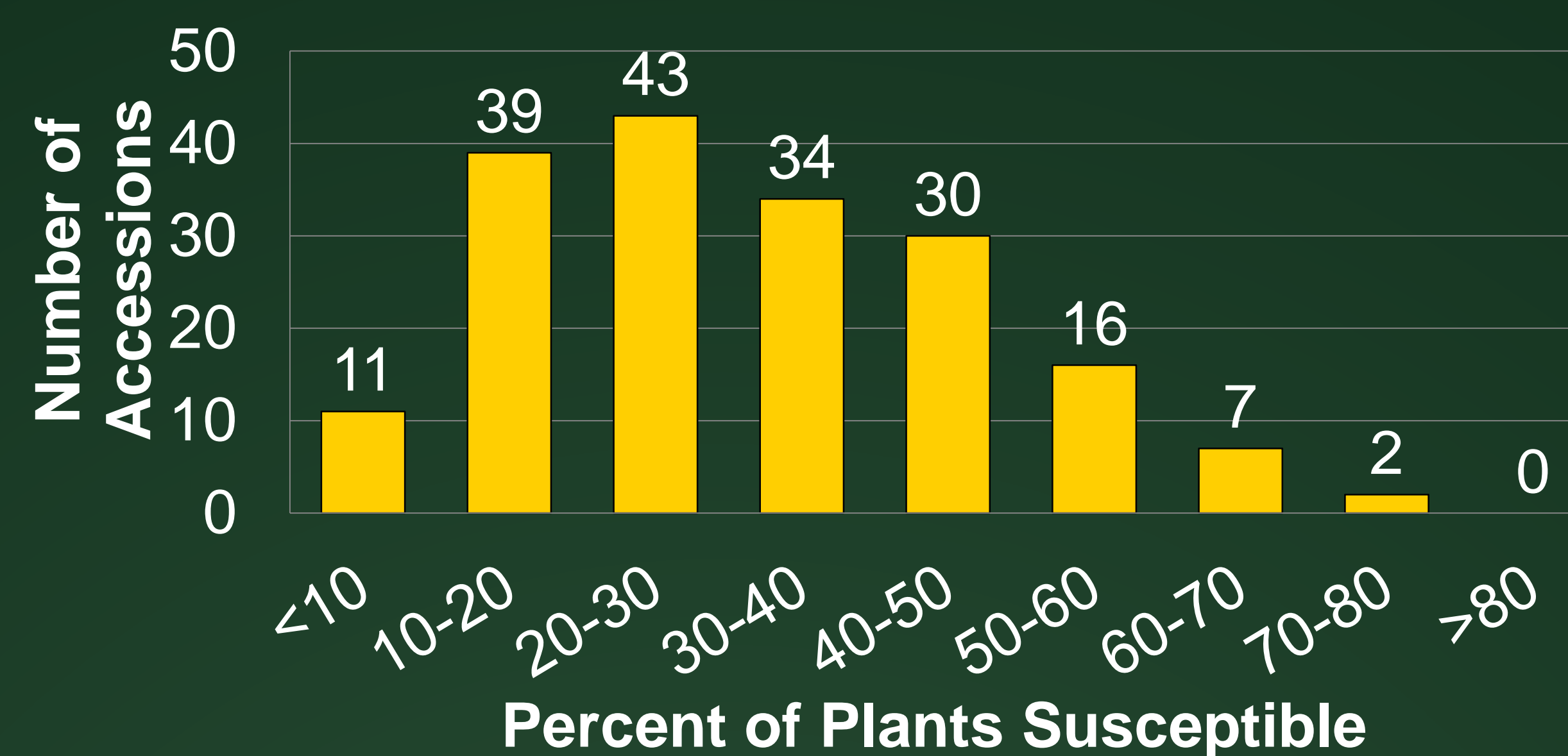


Figure 2a. Most resistant 10 percent of *H. annuus* accessions. Twenty-two accessions categorized by percent plants susceptible to *P. halstedii* race 777.

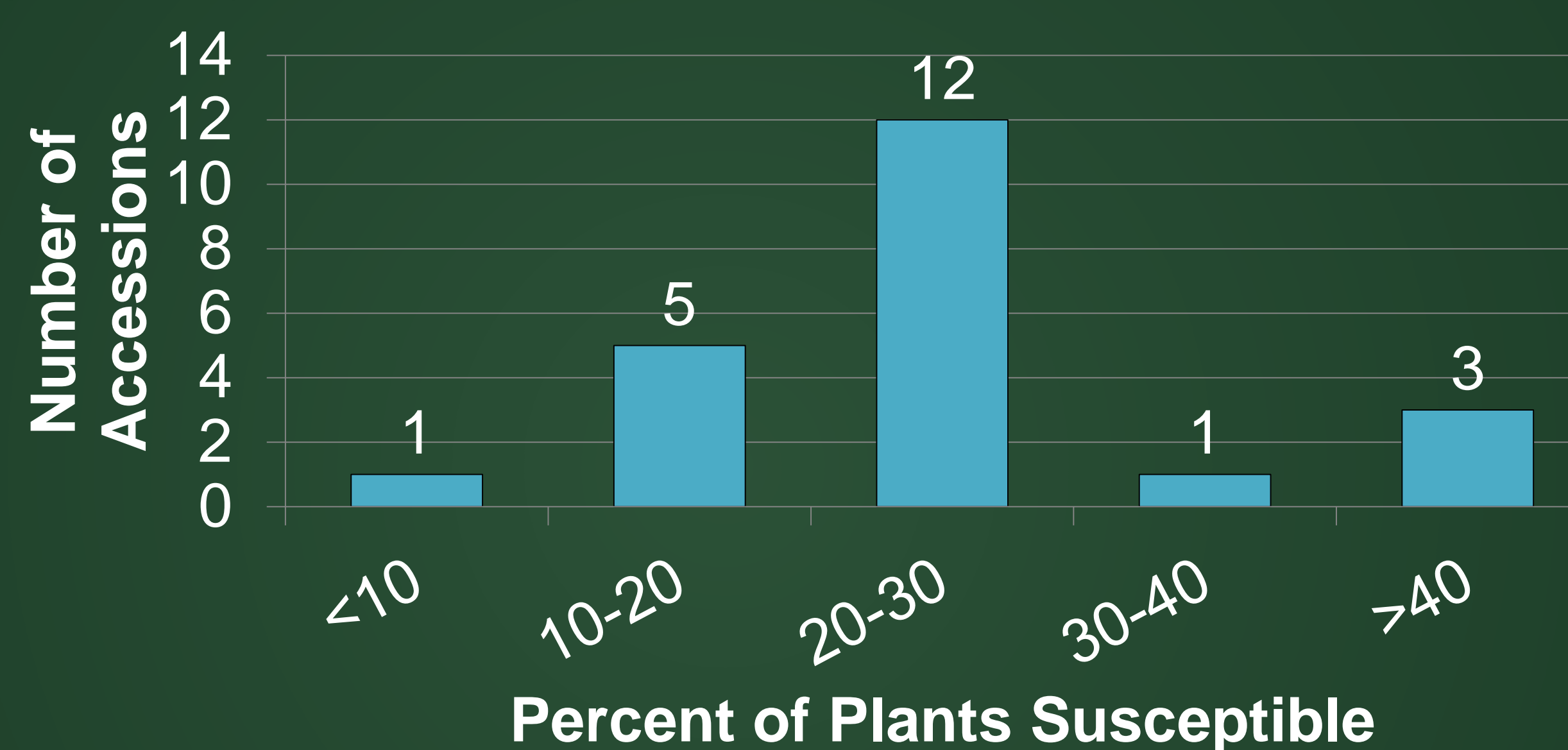


Figure 3a. Number of *H. annuus* accessions, categorized by percent plants susceptible to *P. helianthi* race 336.

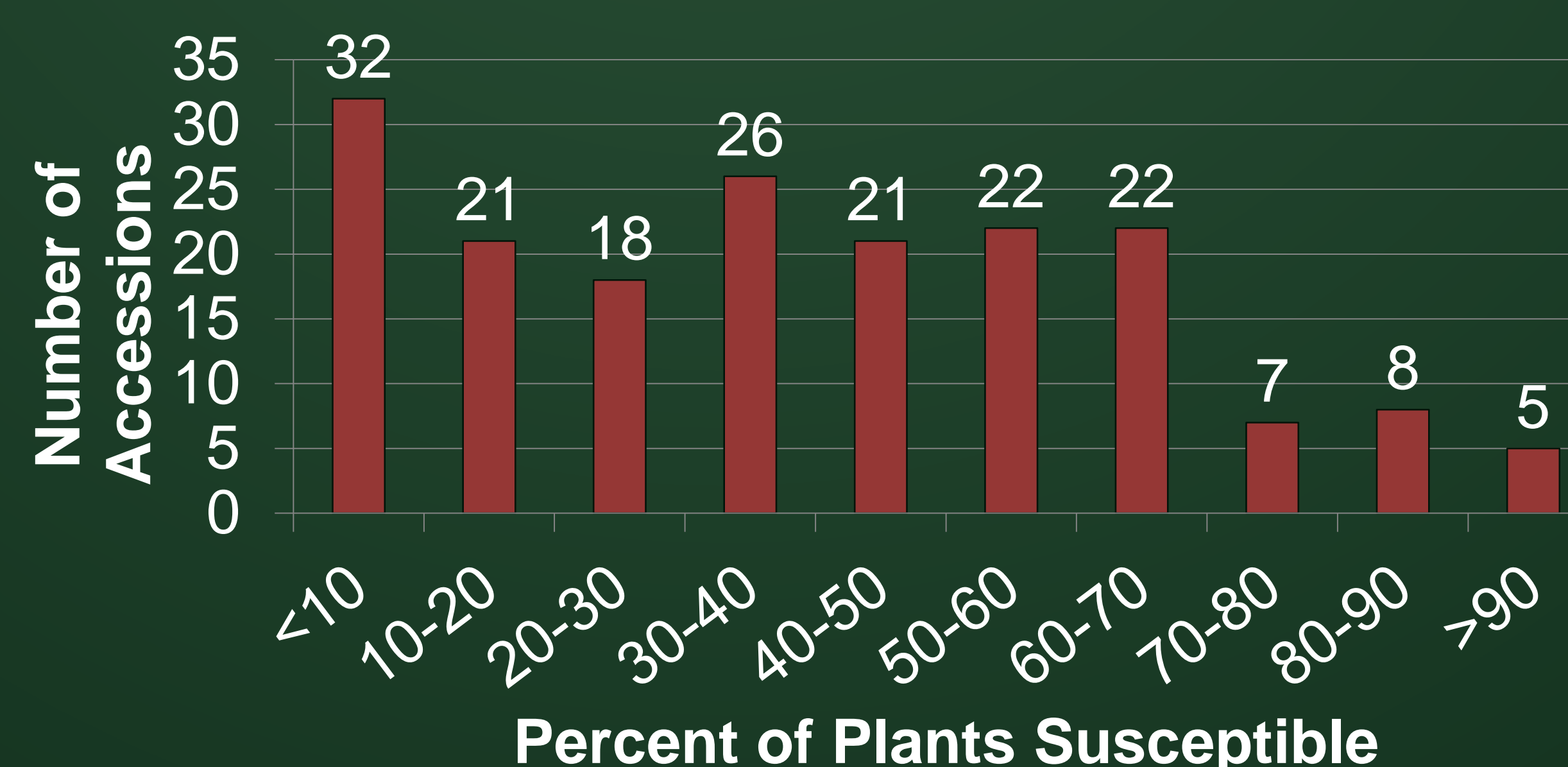


Figure 1b. Number of *H. argophyllus* accessions, categorized by percent plants susceptible to *P. halstedii* race 734.

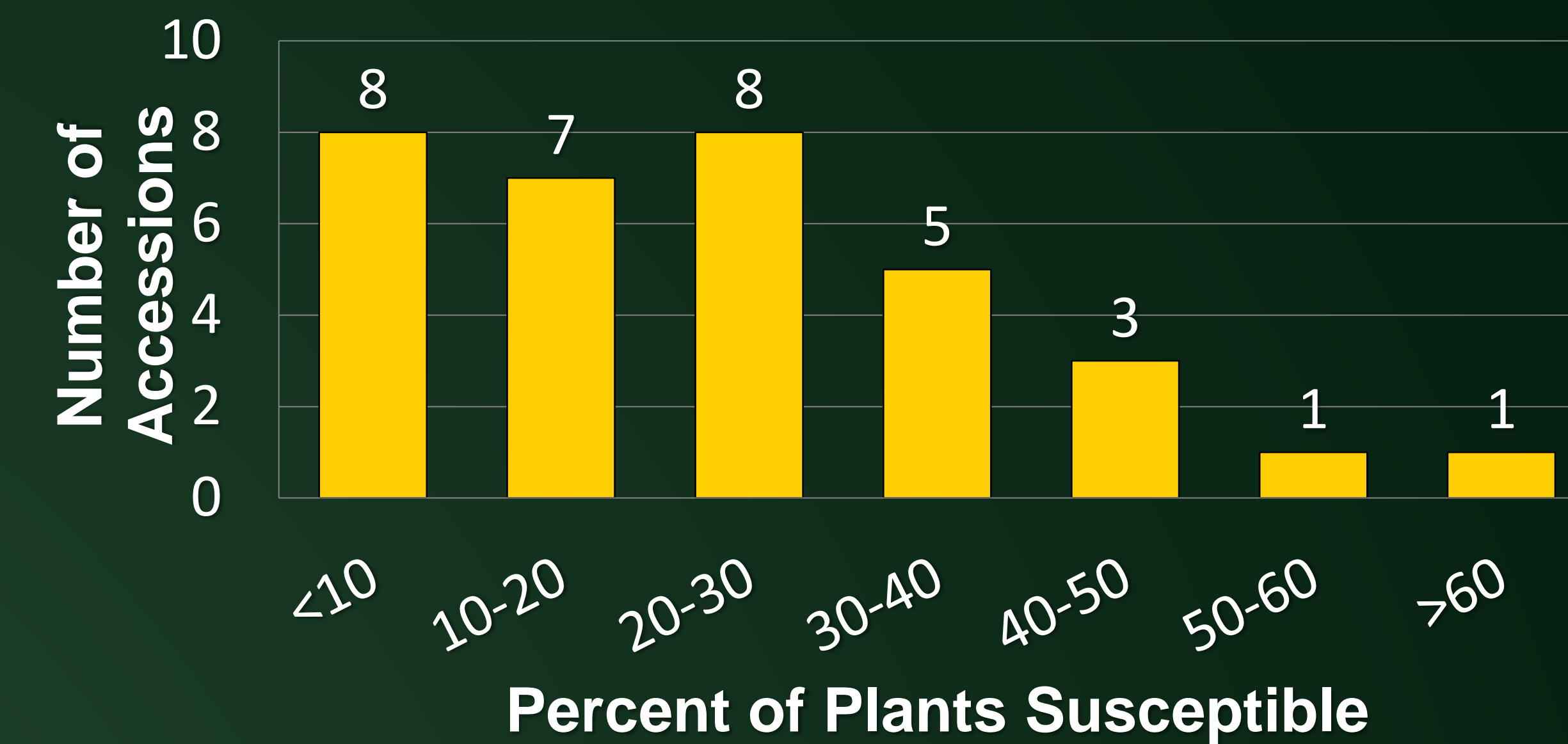


Figure 2b. Most resistant 10 percent of *H. argophyllus* accessions. Three accessions categorized by percent plants susceptible to *P. halstedii* race 777.

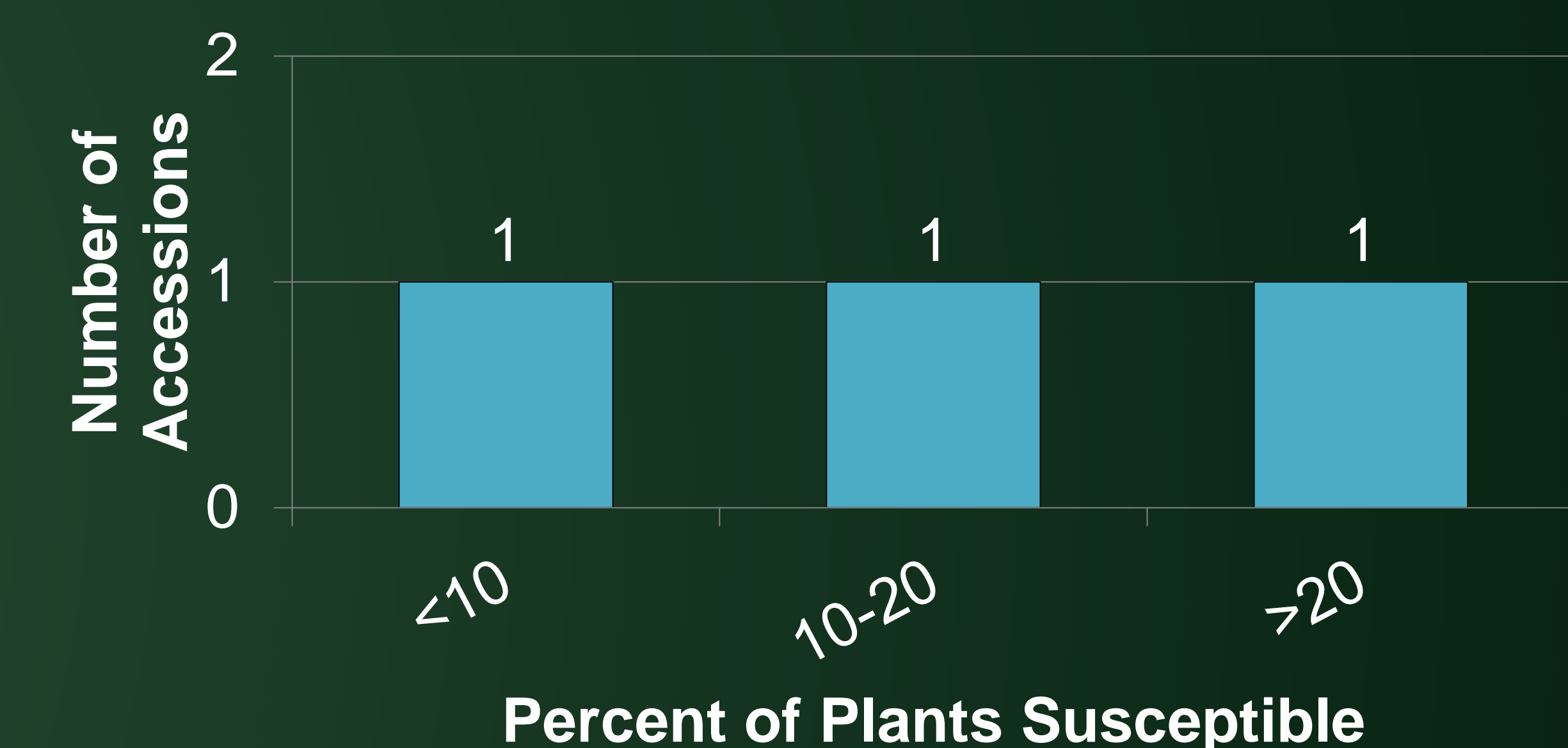


Figure 3b. Number of *H. argophyllus* accessions, categorized by percent plants susceptible to *P. helianthi* race 336.

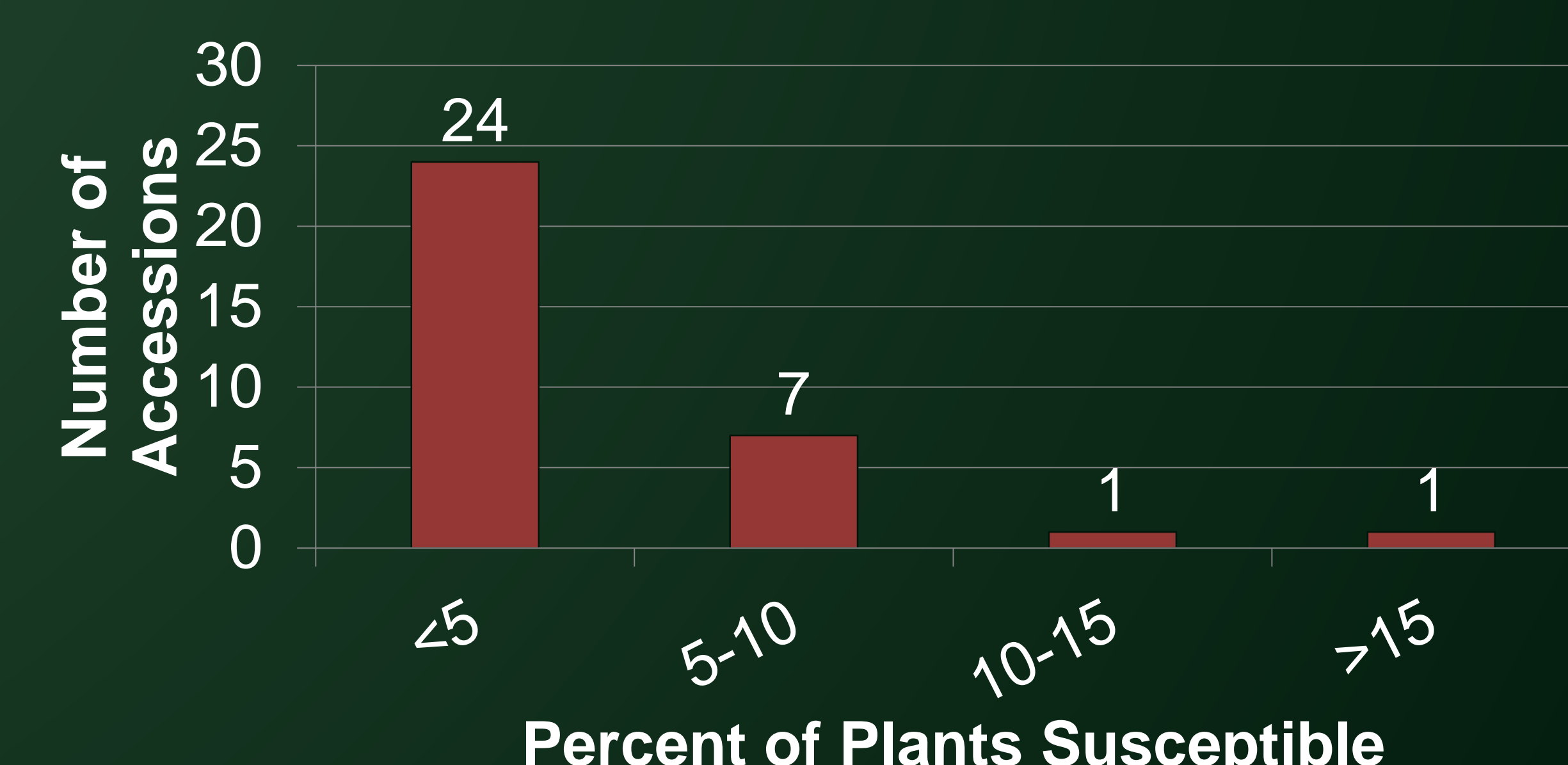


Figure 4. Accessions with susceptibility percentages below 30 percent in all three screenings.

