HOST SUITABILITY OF ASIATIC ELM SPECIES AND HYBRIDS FOR LARVAE AND ADULTS OF THE ELM LEAF BEETLE (COLEOPTERA: CHRYSOMELIDAE)

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Abstract. Selected elms (*Ulmus* spp.) and their hybrids growing at The Morton Arboretum in Lisle, Illinois, U.S., were evaluated in no-choice larval and adult suitability laboratory bioassays for the elm leaf beetle, *Pyrrhalta luteola* Müller. No-choice larval suitability studies revealed that the elm biotypes of *U. davidiana* × *U. japonica, U. elongata, U. parvifolia, U. szechuanica,* and *U.* 'Morton'-Accolade™ were the least suitable for larval development and pupation. *Ulmus davidiana* × *U. japonica-wilsoniana-pumila, U. pumila* (reference), *U. lamellosa, U. macrocarpa, U. szechuanica* × *U. japonica, U.* 'Morton Plainsman'-Vanguard™, and *U.* 'Morton Red Tip'-Danada Charm™ were more suitable for larval development and pupation. Similar low and high suitability rankings were also observed for adult beetles in no-choice studies reared from the larval suitability study. Larval development time and proportion of larvae reaching pupation appear to be good predictors of adult emergence. Larvae feeding on less suitable biotypes took longer to develop with a lesser proportion of adults emerging. The reverse is also true. Preovipositional period was found, in part, to be a function of suitability. Female longevity reflected suitability for the elms tested in this study. *Ulmus pumila* appears to be a major influence on both larval and adult host suitability. The least suitable elm biotypes, listed above, show promise for future elm breeding programs and for use in localities with acute and chronic elm leaf beetle populations.

Key Words. *Pyrrhalta luteola*; elm leaf beetle; *Ulmus*; larval development; adult suitability.

The elm leaf beetle (*Pyrrhalta luteola* Müller) is a common defoliator of elms (*Ulmus* spp.) and is a significant pest affecting urban elm trees in most parts of the United States (Kielbaso and Kennedy 1983; Nielsen et al. 1985; Wu et al. 1991). It is Europe and was imported into the United States in the 1830s. The Siberian elm (*Ulmus pumila* L.) is widely accepted as a highly preferred host.

In recent years, studies have been conducted to evaluate many elm biotypes for feeding preference and to measure the suitability of Asian, European, and North American elms for adult elm leaf beetles. *Ulmus pumila* has been widely planted both as a windbreak tree and as a replacement for American elm (*U. americana* L.) owing to losses from Dutch elm disease. Many communities throughout the range of the elm leaf beetle have large numbers of Siberian elm (*U. pumila*) that experience chronic defoliation leading to tree stress and potential mortality from secondary pests (e.g., borers, facultative pathogens).

Seed sources of new Chinese elm species recently became available, resulting in extensive breeding programs for Asian elms resistant to Dutch elm disease (Ware 1992, 1995). Many of these Asian elms and hybrids have been evaluated for susceptibility to feeding by the elm leaf beetle, and a number of biotypes such as *U. parvifolia* Jacquin, *U. wilsoniana* Schneider, *U. japonica* Sargent, *U. davidiana* Planchen, and *U. szechuanica* Fang, show very low to low suitability (Hall 1986; Hall et al. 1987; Hall and Young 1986; Miller and Ware 1994, 1997, 1999; Young and Hall 1986).

Previous studies, except two (Hall and Young 1986; Luck and Scriven 1979), utilized adult beetles in no-choice and multiple-choice laboratory feeding bioassays. While helpful in determining preference and suitability, these studies did not establish whether the elm leaf beetle is capable of successfully completing its life cycle and were limited in the number of Asiatic elm biotypes tested.

The experiment presented here examined the suitability of 28 elm biotypes for elm leaf beetle larvae (Table 1). Adults reared from the larval suitability study were also utilized in a no-choice study using the same elm biotypes (Table 2). The results provide a more comprehensive picture of the suitability of Asian elm biotypes for the elm leaf beetle and provide further direction for future elm breeding programs for resistance to elm leaf beetles.

MATERIALS AND METHODS

No-Choice Larval Suitability Laboratory Bioassay

We used newly emerged and unfed elm leaf beetle (*P. luteola*) larvae hatching from eggs laid on the foliage of *U. pumila* seedlings. These seed-

Table 1. Mean development time, percent pupation, and percent adult emergence of *P. luteola* in the no-choice larval suitability bioassay.

Species/hybrid	N[z]	Development time (larva to adult) (d)[y]	Percent pupation[y]	Percent adult emergence[y]
U. castaneifolia	30	—[x]	3 ± 0.03 a	0 ± 0.00 a
U. changii	30	26 ± 1.00 ab	7 ± 0.05 a	7 ± 0.05 a
U. chenmoui	30	25 ± 0.75 ab	40 ± 0.09 b	40 ± 0.09 b
U. davidiana	30	—[x]	3 ± 0.03 a	0 ± 0.00 a
U. davidiana × *U. japonica*	30	21 ± 0.83 ab	23 ± 0.08 a	23 ± 0.08 a
U. davidiana × *U. japonica-wilsoniana-pumila*	30	13 ± 0.30 a	57 ± 0.09 b	53 ± 0.08 b
U. davidiana × *U. propinqua*	30	—[w]	0 ± 0.00 a	0 ± 0.00 a
U. davidiana × *U.* 'Morton'-Accolade™	30	25 ± 1.00 ab	3 ± 0.03 a	3 ± 0.03 a
U. elongata	30	—[w]	0 ± 0.00 a	0 ± 0.00 a
U. gaussenii	30	25 ± 1.7 ab	13 ± 0.06 a	13 ± 0.06 a
U. glaucescens	30	19 ± 0.46 a	50 ± 0.09 b	47 ± 0.09 b
U. japonica	30	21 ± 0.53 ab	30 ± 0.09 ab	30 ± 0.09 ab
U. lamellosa	30	19 ± 0.53 a	40 ± 0.09 b	37 ± 0.09 b
U. macrocarpa	30	18 ± 0.37 a	57 ± 0.09 b	50 ± 0.07
U. parvifolia	30	—[w]	0 ± 0.00 a	0 ± 0.00 a
U. propinqua	30	20 ± 1.0 ab	7 ± 0.05 a	7 ± 0.05 a
U. pumila (reference)	30	18 ± 0.42 a	53 ± 0.09 b	53 ± 0.09 b
U. szechuanica	30	—[w]	0 ± 0.00 a	0 ± 0.00 a
U. szechuanica × *U. japonica*	30	18 ± 0.21 a	50 ± 0.09 b	47 ± 0.09 b
U. wilsoniana	30	20 ± 0.40 ab	33 ± 0.09 ab	30 ± 0.09 ab
U. 'Morton'-Accolade™	30	27 ± 1.67 b	20 ± 0.09 a	20 ± 0.09 a
U. 'Morton'-Accolade™ × *U. japonica*	30	22 ± 1.00 ab	7 ± 0.05 a	7 ± 0.05 a
U. 'Morton'-Accolade™ × *U. pumila*	30	18 ± 0.33a	40 ± 0.10 b	40 ± 0.10 b
U. 'Morton Glossy'-Triumph™	30	21 ± 1.2 ab	23 ± 0.08 a	23 ± 0.08 a
U. 'Morton Plainsman'-Vanguard™	30	19 ± 0.33 a	53 ± 0.09 b	53 ± 0.09 b
U. 'Morton Plainsman'-Vanguard™ × *U. davidiana*	30	21 ± 0.84 ab	23 ± 0.08 a	23 ± 0.08 a
U. 'Morton Plainsman'-Vanguard™ × *U. japonica-wilsoniana-pumila*	30	21 ± 0.70 ab	30 ± 0.09 ab	30 ± 0.09 ab
U. 'Morton Red Tip'-Danada Charm™	30	19 ± 0.54 a	53 ± 0.09 b	53 ± 0.09 b

[z]Represents ten individual larvae for each of three individual trees for each elm biotype.

[y]Values within columns followed by the same letter are not significantly different ($P = 0.05$; Student-Newman-Keuls (SNK) multiple comparison test).

[x]Larvae reached pupation, but no adults emerged.

[w]No larvae reached pupation.

lings were growing in 7.6-L (2-gal) pots and covered with light screen mesh to prevent beetles from escaping. Seedlings were held in the laboratory at 25°C (77°F) and under 16:8 h (L:D) photoperiod. Adult beetles were reared from late instar larvae and pupae collected from *U. pumila* trees at North Platte, Nebraska, and shipped overnight to The Morton Arboretum, Lisle, Illinois. On arrival, these larvae and pupae were held in clear Plexiglas cages in an incubator at 25°C and 16:8 (L:D) h photoperiod. As adults emerged, they were released onto *U. pumila* seedlings and allowed to feed, mate, and oviposit.

For the host suitability test, we used 24-h-old *P. luteola* larvae. Neonates of *P. luteola* initially cluster at or near the egg mass before initiation of feeding; these were randomly selected from an egg mass and transferred to a single leaf of the test elm that was placed in a plastic petri dish (0.6 × 10.0 mm). Ten such petri dishes (subreplicates) were used for each tree replicate, and there were three trees per elm biotype. Petri dishes were placed into a clear plastic bag to retain the moisture. The petri dishes were checked daily for larval mortality, evidence of feeding, prepupation, pupation, and adult emergence.

Test elm biotypes ranged from 5 to15 m (15 to 50 ft) high, with diameters 5 to 40 cm (2 to 16 in.) at a height of 1.5 m (5 ft). Leaves for the bioassays were randomly collected at ground level from the lower half of trees at all four cardinal directions. The leaf samples included the terminal 31 cm (12 in.) of elm branches. Only fully expanded leaves were used. Leaf samples were taken in this way to compensate for variation in leaf quality within trees. Leaf samples were held

Table 2. Mean number of eggs laid per female, percent females ovipositing, preovipositional period, male longevity, and female longevity of adult *P. luteola* reared in the larval suitability experiment.

Species/hybrid	N[z]	Eggs laid/ female[y]	Percent females ovipositing[y]	Preovipositional period (d)[y]	Male longevity(d)[y]	Female longevity (d)[y]
U. changii	1	200 ± 30.1 c	100 ± 15.0 c	9 ± 1.0 b	1 ± 0.1 a	21 ± 0.6 c
U. chenmoui	4	11 ± 6.2 a	100 ± 15.0 c	20 ± 2.5 c	20 ± 0.6 c	21 ± 0.6 c
U. davidiana × *U. japonica*	3	20 ± 11.8 a	66 ± 33.0 ab	7 ± 4.5 a	9 ± 4.8 b	2 ± 0.5 a
U. davidiana × *U. japonica-wilsoniana-pumila*	3	168 ± 18.6 c	100 ± 20.0 ab	11 ± 3.0 b	17 ± 4.0 c	20 ± 4.1 c
U. davidiana × *U. japonica U.* 'Morton'-Accolade™	3	129 ± 44.6 b	100 ± 15.0 c	11 ± 1.5 b	17 ± 2.3 c	20 ± 1.0 c
U. gaussenii	1	39 ± 9.5 ab	100 ± 18.0 c	16 ± 2.0 c	21 ± 1.2 c	20 ± 0.0 c
U. glaucescens	4	8 ± 3.6 a	38 ± 19.0 ab	14 ± 4.5 c	15 ± 2.2 c	15 ± 2.3 b
U. japonica	3	0 ± 0.0 a	0 ± 0.0 a	—	10 ± 3.3 b	5 ± 1.2 a
U. lamellosa	4	61 ± 23.0 ab	33 ± 18.0 ab	10 ± 1.0 b	12 ± 4.3 b	16 ± 3.5 b
U. macrocarpa	5	77 ± 19.1 ab	80 ± 20.0 b	11 ± 1.0 b	15 ± 2.2 c	18 ± 1.2 c
U. propinqua	1	23 ± 11.9 a	100 ± 20.0 c	19 ± 2.0 c	21 ± 0.9 c	21 ± 1.0 c
U. pumila (reference)	4	135 ± 28.9 c	67 ± 33.0 ab	8 ± 1.0 a	10 ± 5.9 b	19 ± 0.9 c
U. szechuanica × *U. japonica*	6	98 ± 41.1 b	67 ± 33.0 ab	5 ± 1.7 a	15 ± 2.5 c	15 ± 2.6 b
U. wilsoniana	3	85 ± 31.1 ab	100 ± 17.0 c	8 ± 0.6 a	20 ± 0.6 c	21 ± 0.0 c
U. 'Morton'-Accolade™	1	207 ± 25.0 d	100 ± 15.0 c	8 ± 0.6 a	21 ± 0.6 c	11 ± 5.2 b
U. 'Morton'-Accolade™ × *U. pumila*	4	155 ± 31.2 c	100 ± 25.0 c	7 ± 2.0 a	6 ± 2.1 a	20 ± 1.0 c
U. 'Morton Glossy'-Triumph™	2	0 ± 0.0 a	0 ± 0.0 a	—	19 ± 2.5 c	15 ± 1.6 b
U. 'Morton Plainsman'-Vanguard™	6	188 ± 19.7 c	100 ± 20.0 c	7 ± 2.3 a	19 ± 0.9 c	18 ± 1.7 c
U. 'Morton Plainsman'-Vanguard™ × *U. pumila U. davidiana*	3	102 ± 68.0 b	67 ± 33.0 ab	7 ± 4.0 a	7 ± 4.6 a	15 ± 4.3 b
U. 'Morton Plainsman'-Vanguard™ × *U. pumila U. japonica-wilsoniana-pumila*	5	84 ± 41.2 ab	40 ± 20.0 ab	7 ± 0.5 a	18 ± 3.0 c	20 ± 1.4 c
U. 'Morton Red Tip'-Danada Charm™	8	178 ± 25.1 c	100 ± 15.0 c	7 ± 1.3 a	17 ± 1.0 c	21 ± 0.3 c

[z]Number of adult male/female *P. luteola* pairs reared from the larval suitability experiment.

[y]Values within columns followed by the same letter are not significantly different ($P = 0.05$; Student-Newman-Keuls (SNK) multiple comparison test).

in cold storage in plastic bags at 5°C (41°F) for a maximum of 3 d. Leaves collected from each test tree for each biotype were combined for the bioassays. Larval bioassays ceased when larvae died or when adults emerged.

Proportion of larvae pupating was calculated by totaling pupae on each tree of a given elm biotype. Larval suitability for each biotype was measured as the mean proportion of larvae pupating and mean larval development time.

No-Choice Adult Suitability Laboratory Bioassay

Adults emerging from the larval suitability experiment were placed in standard plastic petri dishes on leaves from the same test elms. Methods for this bioassay were conducted as previously described by Miller and Ware (1994, 1997, 1999). Suitability for a biotype was defined as the mean number of eggs laid per female and the mean percentage of ovipositing females. Mean preovipositional period (POP), male longevity, and female longevity also were determined as previously described by Miller and Ware (1994, 1997, 1999).

Statistical Analysis

Measures of larval and adult suitability were subjected to analysis of variance (ANOVA) using biotype as the main effect. Proportional data were arcsine square-root transformed to correct for nonnormality. Means were compared with a Student-Newman-Keuls multiple comparison test. Single linear regression analysis was conducted to determine the relationship between larval and adult suitability variables. Data are presented as original means ± SEM. Data were analyzed using SigmaStat for Windows (Jandel Scientific, 1992).

RESULTS

No-Choice Larval Suitability Laboratory Bioassay

A significantly greater proportion of larvae pupated when fed leaves of *U. chenmoui* Cheng, *U. davidiana* × *U. japonica-wilsoniana-pumila*, *U. glaucescens* Franchet, *U. lamellosa* S. Wang et S.L. Chang et L.K. Fu, *U. macrocarpa* Hance, *U. pumila* (reference), *U. szechuanica* × *U. japonica*, *U.* 'Morton'-Accolade™ × *U. pumila*, *U.* 'Morton Plainsman'-Vanguard™, and *U.* 'Morton Red Tip'-Danada Charm™ compared with the remaining biotypes in which the proportion of larvae pupating was <24% (F = 168.0; df = 27, 839; P < 0.0001). *Ulmus castaneifolia* Hemsley, *U. changii* Cheng, *U. davidiana, U. davidiana* × *U. japonica, U. davidiana* × *U. propinqua*, *U. davidiana* × *U.* 'Morton'-Accolade™, *U. elongata* L. K. Fu et C. S. Ding, *U. gaussenii* Cheng, *U. parvifolia, U. propinqua* Koidzumi, *U. szechuanica, U.* 'Morton'-Accolade™, *U.* 'Morton'-Accolade™ × *U. japonica*, and *U.* 'Morton-Glossy'-Triumph™ were the least suitable for beetle larval development, with <24% of the larvae reaching the pupal stage. (Table 1).

Development time also differed significantly among elm biotypes (F = 38.5; 21, 629, P < 0.04). Larvae feeding on *U. davidiana* × *U. japonica-wilsoniana-pumila*, *U. glaucescens*, *U. lamellosa*, *U. macrocarpa*, *U. pumila* (reference), *U. szechuanica* × *U. japonica*, *U.* 'Morton'-Accolade™ × *U. pumila*, *U.* 'Morton Plainsman'-Vanguard™, and *U.* 'Morton Red Tip'-Danada Charm™ reached adulthood in 18 d (Table 1). Larvae feeding on less suitable biotypes had a mean development time of 21 d (range 20 to 26). Larval development on *U.* 'Morton'-Accolade™ was significantly longer than all other biotypes at 27 d. Larvae feeding on *U. davidiana* × *U. propinqua*, *U. elongata*, *U. parvifolia*, and *U. szechuanica* failed to pupate (Table 1). Larvae feeding on *U. castaneifolia* and *U. davidiana* reached pupation by 21 and 19 d, respectively, but no adults emerged (Table 1).

A significantly greater proportion of adults emerged when larvae fed on *U. chenmoui*, *U. davidiana* × *U. japonica-wilsoniana-pumila*, *U. glaucescens*, *U. lamellosa*, *U. pumila*, *U. macrocarpa*, *U. szechuanica* × *U. japonica*, *U.* 'Morton'-Accolade™ × *U. pumila*, *U.* 'Morton Plainsman'-Vanguard™, and *U.* 'Morton Red Tip'-Danada Charm™ (F = 154.0; df = 27, 839; P < 0.0001 (Table 1). No adults emerged when larvae fed on *U. castaneifolia*, *U. davidiana*, *U. davidiana* × *U. propinqua*, *U. elongata*, *U. parvifolia*, and *U. szechuanica* (Table 1).

Development time from larva to adult was correlated with percent adult emergence (R^2 = 0.31, F = 14.0, df = 24, P = 0.006, y = 23.7 – 0.10x), and the proportion of larvae reaching pupation was highly correlated with adult emergence (R^2 = 0.99, F = 49.1, df = 28, P < 0.0001, y = 0.42 ± 0.95x).

No-Choice Adult Suitability Laboratory Bioassay

Females laid significantly more eggs on ten biotypes, *U. changii*, *U. davidiana* × *U. japonica-wilsoniana-pumila*, *U. davidiana* × *U.* 'Morton'-Accolade™, *U. pumila* (reference), *U. szechuanica* × *U. japonica*, *U.* 'Morton'-Accolade™, *U.* 'Morton'-Accolade™ × *U. pumila*, *U.* 'Morton Plainsman'-Vanguard™, *U.* 'Morton Plainsman'-Vanguard™ × *U. davidiana*, and *U.* 'Morton Red Tip'-Danada Charm™ compared with other biotypes (F = 56.5; df = 20, 74; P < 0.0001) (Table 2). Significantly fewer eggs or no eggs were laid on six biotypes (*U. chenmoui*, *U. davidiana* × *U. japonica*, *U. glaucescens*, *U. japonica*, *U. propinqua*, and *U.* 'Morton Glossy'-Triumph™. *Ulmus gaussenii*, *U. lamellosa*, *U. macrocarpa*, *U. wilsoniana*, and *U.* 'Morton Plainsman'-Vanguard™ × *japonica-wilsoniana-pumila* were intermediate in suitability (Table 2).

The mean percentage of females ovipositing differed significantly among biotypes (F = 23.4; df = 20, 74; P < 0.02). The most suitable biotypes had 80% to 100% females ovipositing.

Mean preovipositional period (POP) was significantly different among biotypes (F = 40.8; df = 18, 69; P < 0.003). Females feeding on highly suitable biotypes laid eggs within 5 to 16 d of being introduced to the elm leaves. Female beetles feeding on less suitable elms laid eggs 7 to 20 d (mean = 15 d) or 6 d later into the study. Beetles feeding on the more highly suitable biotypes of *U. pumila*, and *U.* 'Morton Red Tip'-Danada Charm™ in this study are consistent with results reported by Miller and Ware (1994, 1997, 1999).

Overall, adult male and females lived approximately 15 and 17 d, respectively. Rankings for both male and female longevity were significant (male, F = 30.3; df = 20, 74; P < 0.05 and female; F = 44.6; df = 20, 74; P = 0.001). Males lived longer (>14 d) on *U. chenmoui*, *U. davidiana* × *U. japonica-wilsoniana-pumila*, *U. davidiana* × *U.* 'Morton'-Accolade™, *U. gaussenii*, *U. glaucescens*, *U. macrocarpa*, *U. propinqua*, *U. szechuanica* × *U. japonica*, *U. wilsoniana*, *U.* 'Morton'-Accolade™, *U.* 'Morton Glossy'-Triumph™, *U.* 'Morton Plainsman'-Vanguard™, *U.* 'Morton Plainsman'-Vanguard™ × *U. japonica-wilsoniana-pumila*, and *U.* 'Morton Red Tip'-Danada Charm™. Similar rankings were observed for female longevity for these same elm biotype, with the exception of *U. changii* and *U.* 'Morton'-Accolade™ × *U. pumila*, where females lived 20 to 21 d and males lived 1 to 6 d, respectively.

DISCUSSION

Larval development time and proportion of larvae reaching pupation appear to be good predictors of adult emergence. Larvae feeding on less suitable biotypes took longer to develop with a lesser proportion of adults emerging. The reverse is also true.

Preovipositional period is a function, in part, of suitability because adults feeding on the least suitable elms laid eggs later into the study than females feeding on the most suitable biotypes of *U. pumila*, *U.* 'Morton'-Accolade™ × *U. pumila*, *U.* 'Morton Plainsman'-Vanguard™, and *U.* 'Red Tip'-Danada Charm™. Adult female longevity reflects suitability for the elm biotypes tested in this study.

Consistent with other reported studies, *U. pumila* appears to be a major source of both larval and adult host suitability (Young and Hall 1986; Miller and Ware 1994, 1997, 1999). Simple and complex hybrids containing *U. pumila*, such as *U. davidiana* × *U. japonica-wilsoniana-pumila*, *U.* 'Morton Plainsman'-Vanguard™, and *U.* 'Morton Plainsman'-Vanguard™ × *U. davidiana, U.* 'Morton Red Tip'-Danada™ demonstrated moderate to high larval and adult suitability in this study. Taken alone, *U. davidiana, U. japonica,* and *U. wilsoniana* demonstrated low adult suitability (Miller and Ware 1994, 1997, 1999; Hall 1986; Hall and Townsend 1987). In addition, *U. japonica* also appears to modestly enhance suitability as seen with the simple and complex hybrids of *U. szechuanica* × *U. japonica* and *U.* 'Morton'-Accolade™ × *U. japonica* by adult female beetles (Miller and Ware, 1994). Alone, *U. szechuancia* exhibited extremely low suitability with no eggs being laid by adult female beetles (Miller and Ware 1994). In contrast, *U. davidiana* appears to somewhat preserve reduced suitability as seen with the simple hybrids of *U. davidiana* × *U. japonica* and *U. davidiana* × *U. propinqua.* When evaluated alone, *U. davidiana, U. japonica,* and *U. propinqua* revealed low adult suitability (Miller and Ware 1994, 1997, 1999).

In summary, results from this study indicate that *U. chenmoui, U. davidiana, U. davidiana* × *U. japonica, U. davidiana* × *U. propinqua, U. elongata, U. glaucescens, U. macrocarpa, U. parvifolia, U. propinqua, U. szechuanica, U. wilsoniana, U.* 'Morton'-Accolade™, and *U.* 'Morton Glossy'-Triumph™ have low suitability for both elm leaf beetle larvae and adults. The results reported here provide valuable information on the effect of Asiatic elm hosts on elm leaf beetle larval development and adult fecundity. Information from this study will be helpful in utilizing these elm biotypes in future elm breeding programs and for potential use in landscapes and urban forests where both acute and chronic elm leaf beetle populations are present.

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Résumé. Divers ormes (*Ulmus* spp. et hybrides d'ormes poussant au Morton Arboretum de Lisle en Illinois) ont été évalués par des bio-essais en laboratoire en regard des préférences aux stades larvaire et adulte du galéruque de l'orme, *Pyrrhalta luteola* Müller. Les études de préférences ont révélé que les génotypes d'ormes de *U. davidiana* × *U. japonica*, *U. elongata*, *U. parvifolia*, *U. szechuanica*, et *U.* 'Morton'-Accolade™ étaient les moins propices pour le développement aux stades de larve et de pupe. *Ulmus davidiana* × *U. japonica-wilsoniana-pumila*, *U. pumila* (référence), *U. lamellosa*, *U. macrocarpa*, *U. szechuanica* × *U. japonica*, *U.* 'Morton Plainsman'-Vanguard™, and *U.* 'Morton Red Tip'-Danada Charm™ étaient plus intéressants pour le développement aux stades de larve et de pupe. Des degrés similaires d'intérêt (peu ou très propice) étaient aussi observés pour le galéruque adulte dans les études de préférence. La période de développement larvaire et la proportion de larves atteignant le stade de pupe apparaissent être de bons indicateurs du degré d'émergence au stade adulte. Les larves se nourrissant sur des génotypes moins intéressants pour elles se sont développées plus lentement et avec une proportion moindre d'adulte lors de leur émergence. Le contraire est aussi vrai. La période de pré-oviposition s'est avérée être, en partie, fonction du degré d'intérêt. La longévité de la femelle reflète le degré d'intérêt pour les divers ormes testés dans cette étude. *Ulmus pumila* apparaît être d'une influence majeure à la fois sur les stades larvaire et adulte dans les préférences de l'insecte. Les génotypes d'ormes les moins intéressants pour le galéruque qui ont été énumérés précédemment s'avèrent prometteurs pour les programmes futurs d'hybridation d'ormes et pour leur utilisation dans les communautés aux prises avec des problèmes aigus et chroniques de galéruques de l'orme.

Zusammenfassung. Im Morton Arboretum in Maryland in Illinois wurden ausgewählte *Ulmen* spp. Und ihre Hybriden in einem Laborversuch in Bezug auf ihre Anfälligkeit auf den Ulmenkäfer *Pyrrhalta luteola* getestet. Die Untersuchungen der Larvenverträglichkeit zeigten deutlich, dass die Ulmengenotypen von *U. davidiana* × *U. japonica*, *U. elongata*, *U. parvifolia*, *U. szechuanica*, and *U.* 'Morton'-Accolade™ am wenigsten für die Entwicklung von Larven und ihrer Verpuppung geeignet sind. *Ulmus davidiana* × *U. japonica-wilsoniana-pumila*, *U. pumila* (reference), *U. lamellosa*, *U. macrocarpa*, *U. szechuanica* × *U. japonica*, *U.* 'Morton Plainsman'-Vanguard™, und *U.* 'Morton Red Tip'-Danada Charm™ sind mehr für die Entwicklung und Verpuppung von Larven geeignet. Ähnlich niedrige und hohe Eignungen wurden in den Studien mit den erwachsenen Käfern erzielt. Die Larvenentwicklungszeit und der Anteil der sich verpuppenden Larven scheint ein guter Indikator für das Aufkommen von erwachsenen Käfern. Larven, die sich auf weniger geeigneten Genotypen entwickelten, brauchten länger und ließen eine geringere Anzahl von Käfern entstehen. Das Gegenteil trifft ebenfalls zu. Die Periode vor der Eiablage schien teilweise hier eine Funktion zu haben. Die weibliche Lebensdauer reflektierte die Eignung der getesteten Ulmen. *U. pumila* schien einen großen Einfluss auf die Entwicklung von Larven und Käfern zu haben. Die weniger geeigneten Genotypen (s.o.) zeigten sich vielversprechend für zukünftige Ulmenzuchtprogramme und schienen auch geeignet für den Einsatz an Standorten mit akuter und chronischer Ulmenpopulation.

Resumen. Fueron evaluados olmos seleccionados, *Ulmus* spp y sus híbridos del Morton Arboretum Lisle, Il en bioensayos de laboratorio para conocer susceptibilidad a las larvas y adultos del escarabajo *Pyrrhalta luteola* Müller. Los estudios con larvas revelaron que los genotipos de *Ulmus davidiana* × *U. japónica*, *U. elongata*, *U. parvifolia*, *U. szechuanica* y *U.* 'Morton'-Accolade,™ fueron los menos susceptibles al desarrollo y pupación de la larva. *Ulmus davidiana* × *U. japónica-wilsonia-pumila*, *U. pumila* (de referencia), *U. lamellosa*, *U. macrocarpa*, *U. szechuanica* × *U. japónica*, *U.* 'Morton Plainsman'-Vanguard™ y *U.* 'Morton Red Tip'-Danada Charm™, fueron los más susceptibles para el desarrollo y pupación de la larva. Similares bajos y altos rangos de susceptibilidad fueron observados para los escarabajos adultos. El tiempo de desarrollo de la larva y la proporción de las mismas que alcanzan la pupación, parecen ser un buen indicador de la emergencia de los adultos. Las larvas que se alimentaron en los genotipos menos susceptibles tomaron más tiempo en desarrollarse con menor proporción de emergencia de adultos. Lo opuesto es también cierto. Se encontró que el período de preovoposición en parte es una función de la susceptibilidad. La longevidad de las hembras reveló susceptibilidad para los olmos probados en este estudio. *Ulmus pumila* parece tener mayor influencia en la susceptibilidad tanto en las larvas como en los adultos. Los genotipos menos susceptibles, mencionados arriba, son promisorios en programas de mejoramiento y para uso en localidades con poblaciones agudas y crónicas de escarabajos del olmo.