**Supplementary Tables**

Table S1. Details of oligonucleotide primers used in this study.

| Primer | Primer sequence (5'-3') | Sense | Target | References |
|---|---|---|---|---|
| P1 | AGA-GTT-TGA-TCC-TGG-CTC-AGG-A | Forward | 16S rDNA | [1] |
| P7 | CGT-CCT-TCA-TCG-GCT-CTT | Reverse | 23S rDNA | [1] |
| P1A | AAC-GCT-GGC-GGC-GCG-CCT-AAT-AC | Forward | 16S rDNA | [2] |
| P7A | CCT-TCA-TCG-GCT-CTT-AGT-GC | Reverse | 23S rDNA | [2] |
| fB1 | GAC-CCT-TCA-AAA-GGT-CTT-AG | Forward | 16S rDNA | [3] |
| rULWS | GTC-TTT-TAT-ATA-AGA-GAA-ACA-C | Reverse | 16S/23S rDNA spacer region | [3] |
| R16(V)F1 | TTA-AAA-GAC-CTT-CTT-CGG | Forward | 16S rDNA | [4] |
| R16(V)R1 | TTC-AAT-CCG-TAC-TGA-GAC-TAC-C | Reverse | 16S rDNA | [4] |
| rp(V)F1 | TCG-CGG-TCA-TGC-AAA-AGG-CG | Forward | *rpsS* | [2] |
| rp(V)R1 | ACG-ATA-TTT-AGT-TCT-TTT-TGG | Reverse | *rplP* | [2] |
| rp(V)F1A | AGG-CGA-TAA-AAA-AGT-TTC-AAA-A | Forward | *rpsS* | [2] |
| rp(V)R1A | GGC-ATT-AAC-ATA-ATA-TAT-TAT-G | Reverse | *rplP* | [2] |
| FD9f5 | CAA-AAA-ATT-ACT-TTT-GGC-GGG-AC | Forward | *SecY* | [5] |
| MAPr1 | TGC-TCA-AAA-TGA-GCG-CTT-AAA-C | Reverse | *map* | [5] |
| FD9f6 | GTC-GCT-TTA-GAA-TCG-ACA-CA | Forward | *SecY* | [5] |
| MAPr2 | TCG-GAA-GTA-ACA-GCA-GTC-CA | Reverse | *map* | [5] |
| fEY_imp | CAT-TTT-AAA-TAC-TGT-ATA-TTA-AAT-AC | Forward | *imp* | [6] |
| rpyrG | GAC-CTT-TTA-AAC-CAC-ATC-C | Reverse | *imp* | [6] |
| fEY_groEL | GTT-AAT-GAT-GGC-GTT-ACA-ATC-GC | Forward | *groEL* | [6] |
| rEY_groEL | GTT-AAA-GAA-GGA-CTT-TTA-TCC-GC | Reverse | *groEL* | [6] |

Table S2. Phytoplasmas related to the newly recorded alder yellows (ALY) phytoplasma strains in southern Italy examined in this study.

| Phytoplasma (strain) | Geographical origin | Sequence* | GenBank accession No. | Reference/collector(s) |
|---|---|---|---|---|
| Alder yellows (ALY-SI) | Italy | 16S, SR | Y16387 | [7] |
| Alder yellows (ALY) | Italy | 16S | AY197646 | [2] |
| Alder yellows (ALY882) | Germany | 16S | AY197642 | [2] |
| Alder yellows (ALY1068) | Italy | 16S | AY197647 | [2] |
| Alder yellows (SW3) | Germany | 16S | KP238292 | [8] |
| Alder yellows (SW58) | Germany | 16S | KP238298 | [8] |
| Alder yellows (SW1) | Germany | 16S | KP238291 | [8] |
| Alder yellows (SW17) | Germany | 16S | KP238295 | [8] |
| Alder yellows (ALY-L) | Lithuania | 16S | AY028789 | [9] |
| Alder yellows (AldWB) | Poland | 16S, SR | MK440303 | [10] |
| Mugwort witches'-broom (MugWB) | Poland | 16S, SR | MK440304 | [10] |
| Flavescence dorée (FD70) | France | 16S | AY197643 | [2] |
| Flavescence dorée (FD70) | France | 16S, SR | AF176319 | [11] |
| Flavescence dorée (FD-C) | Italy | 16S | AY197645 | [2] |
| Flavescence dorée (FD-D) | Italy | 16S | AY197644 | [2] |
| Flavescence dorée (CH) | Switzerland | 16S, SR | CP097583 | [12] |
| Flavescence dorée (FD1487) | Spain | 16S, SR | AJ548787 | [13] |
| Flavescence dorée (34c2) | Croatia | 16S, SR | HQ712064 | [14] |
| Spartium witches'-broom (SpaWB229) | Italy | 16S | AY197652 | [2] |
| Hemp dogbane yellows (HD1) | USA | 16S | AY197654 | [2] |
| Virginia creeper (VC) | USA | 16S, SR | AF305198 | [2] |
| Rubus stunt (RUS)-Ca.P.rubi | Italy | 16S | AY197648 | [2] |
| Rubus stunt (RUS) | Italy | 16S, SR | Y16395 | [7] |
| Elm yellows (EY1)-Ca.P.ulmi | USA | 16S | AY197655 | [2] |
| Elm yellows (EY1) | USA | 16S, SR | AF122910 | [15] |
| Elm yellows (EYCZ1) | Czech Republic | 16S, SR | EU184021 | [16] |
| Peach yellows (PY-In) | India | 16S | AY197660 | [2] |
| Jujube witches'-broom (JWB-G1)-Ca.P.ziziphi | China | 16S | AB052876 | [17] |
| Jujube witches'-broom (JWB) | China | 16S | AY197661 | [2] |
| Cherry lethal yellows (CLY-5) | China | 16S | AY197659 | [2] |
| Japanese raisin witches'-broom (JRWB) | South Korea | 16S, SR | AB442218 | [18] |
| Balanites witches'-broom (BltWB)-Ca.P.balanitae | Myanmar | 16S, SR | AB689678 | [19] |
| Alder yellows (ALY) | Italy | *rpsV* (*rpl22*), *rpsC* (*rps3*) | AY197666 | [2] |
| Alder yellows (ALY882) | Germany | *rpsV* (*rpl22*), *rpsC* (*rps3*) | AY197662 | [2] |
| Alder yellows (ALY1068) | Italy | *rpsV* (*rpl22*), *rpsC* (*rps3*) | AY197667 | [2] |
| Alder yellows (AldWB) | Poland | *rpsV* (*rpl22*), *rpsC* (*rps3*) | MK806438 | [10] |
| Mugwort witches'-broom (MugWB) | Poland | *rpsV* (*rpl22*), *rpsC* (*rps3*) | MK814810 | [10] |
| Alder yellows (ALY) | Italy | *rpsV* (*rpl22*), *rpsC* (*rps3*) | JN851860 | [20] |
| Spartium witches'-broom (SpaWB229) | Italy | *rpsV* (*rpl22*), *rpsC* (*rps3*) | AY197672 | [2] |
| Spartium witches'-broom (SpaWB251) | Italy | *rpsV* (*rpl22*), *rpsC* (*rps3*) | AY197673 | [2] |
| Hemp dogbane yellows (HD1) | USA | *rpsV* (*rpl22*), *rpsC* (*rps3*) | AY197674 | [2] |
| Flavescence dorée (FD-C) | Italy | *rpsV* (*rpl22*), *rpsC* (*rps3*) | AY197665 | [2] |
| Flavescence dorée (FD-D) | Italy | *rpsV* (*rpl22*), *rpsC* (*rps3*) | AY197664 | [2] |
| Rubus stunt (RUS) | Italy | *rpsV* (*rpl22*), *rpsC* (*rps3*) | AY197668 | [2] |
| Rubus stunt (RuS400) | Italy | *rpsV* (*rpl22*), *rpsC* (*rps3*) | AY197669 | [2] |
| Rubus stunt (RuS971) | Switzerland | *rpsV* (*rpl22*), *rpsC* (*rps3*) | AY197670 | [2] |
| Rubus stunt (RuSR19) | Germany | *rpsV* (*rpl22*), *rpsC* (*rps3*) | AY197671 | [2] |
| Elm yellows (EY1) | USA | *rpsV* (*rpl22*), *rpsC* (*rps3*) | AY197675 | [2] |
| Elm yellows (EY125) | Italy | *rpsV* (*rpl22*), *rpsC* (*rps3*) | AY197676 | [2] |
| Elm yellows (EY626) | Italy | *rpsV* (*rpl22*), *rpsC* (*rps3*) | AY197677 | [2] |
| Elm yellows (EY627) | Italy | *rpsV* (*rpl22*), *rpsC* (*rps3*) | AY197678 | [2] |
| Elm yellows (NK16) | Croatia | *rpsV* (*rpl22*), *rpsC* (*rps3*) | KU202026 | [21] |
| Elm yellows (EY24-SRB) | Serbia | *rpsV* (*rpl22*), *rpsC* (*rps3*) | HM038464 | [22] |
| Peach yellows (PY-In) | India | *rpsV* (*rpl22*), *rpsC* (*rps3*) | AY197680 | [2] |
| Jujube witches'-broom (JWB) | China | *rpsV* (*rpl22*), *rpsC* (*rps3*) | AY197681 | [2] |
| Cherry lethal yellows (CLY5) | China | *rpsV* (*rpl22*), *rpsC* (*rps3*) | AY197679 | [2] |
| Alder yellows (AI-04-3-13)-M35 | Italy | *map* | AM384884 | [5] |
| Alder yellows (74-08-MNE)-M142 | Montenegro | *map* | KC188998 | [23] |
| Alder yellows (AI-AL4)-M113 | Italy | *map* | LT222008 | [24] |

| | | | | |
|---|---|---|---|---|
| Alder yellows (OS-Sep10-179)-M101 | Serbia | *map* | LT221996 | [24] |
| Alder yellows (Ag30-MAC)-M149 | Macedonia | *map* | KJ605451 | [25] |
| Alder yellows (AI-025-08)-M118 | Italy | *map* | LT222013 | [24] |
| Alder yellows (AF-06-30-3)-M50 | France | *map* | FN561864 | [24] |
| Alder yellows (AI-040-08)-M55 | Italy | *map* | LT221950 | [24] |
| Alder yellows (AF-07-22-30)-M45 | France | *map* | LT221940 | [24] |
| Alder yellows (AF-07-28-8)-M31 | France | *map* | LT221926 | [24] |
| Alder yellows (AF-07-25-4)-M20 | France | *map* | LT221915 | [24] |
| Alder yellows (AS-AL11)-M95 | Serbia | *map* | LT221990 | [24] |
| Alder yellows (AF-WJ1444-32)-M2 | France | *map* | LT221897 | [24] |
| Alder yellows (SW7) | Germany | *map* | KP238304 | [8] |
| Alder yellows (F14-F6-584)-M123 | France | *map* | LR585197 | [24] |
| Alder yellows (G14-F10-224)-M124 | Germany | *map* | LR585198 | [24] |
| Alder yellows (AG92) | Bosnia-Herzegovina | *map* | MG551289 | Delic D., Radulovic M. |
| Alder yellows (425) | Croatia | *map* | MG201983 | [26] |
| Alder yellows (85-08-MNE)-M53 | Montenegro | *map* | KC189001 | [23] |
| Alder yellows (SW1) | Germany | *map* | KP238302 | [8] |
| Alder yellows (SW38) | Germany | *map* | KP238315 | [8] |
| Alder yellows (SW32) | Germany | *map* | KP238314 | [8] |
| Alder yellows (SW10) | Germany | *map* | KP238306 | [8] |
| Alder yellows (SW13) | Germany | *map* | KP238307 | [8] |
| Alder yellows (SW23) | Germany | *map* | KP238310 | [8] |
| Alderyellows (SW4) | Germany | *map* | KP238303 | [8] |
| Alder yellows (SW8) | Germany | *map* | KP238305 | [8] |
| Alder yellows (SW17) | Germany | *map* | KP238309 | [8] |
| Alder yellows (periwinkle-maintained ALY)-M36 | Italy | *map* | AM384885 | [5] |
| Alder yellows (F15-21-153)-M127 | France | *map* | LR585201 | [24] |
| Alder yellows (AF-06-30-27)-M48 | France | *map* | LT221943 | [24] |
| Alder yellows (75-08-MNE)-M143 | Montenegro | *map* | KC188999 | [23] |
| Alder yellows (76-08-MNE)-M43 | Montenegro | *map* | KC189000 | [23] |
| Alder yellows (AS-AL11)-M93 | Serbia | *map* | LT221988 | [24] |
| Alder yellows (Ag26-MAC)-M146 | Macedonia | *map* | KJ605448 | [25] |
| Alder yellows (Ag27-MAC)-M147 | Macedonia | *map* | KJ605449 | [25] |
| Alder yellows (Ag29-MAC)-M148 | Macedonia | *map* | KJ605450 | [25] |
| Alder yellows (AF-06-30-25)-M37 | France | *map* | LT221932 | [24] |
| Alder yellows (AF-07-25-7)-M1 | France | *map* | LT221896 | [24] |
| Alder yellows (A06-30-20) | France | *map* | FN561863 | [27] |
| Flavescence dorée (V03-9-2)-M27 | France | *map* | AM384888 | [5] |
| Flavescence dorée (V04-11-19)-M34 | France | *map* | AM384889 | [5] |
| Flavescence dorée (VI04-188-04)-M12 | Italy | *map* | AM384896 | [5] |
| Flavescence dorée (FD70)-M50 | France | *map* | AM238512 | [5] |
| Flavescence dorée (VF-09-112)-M36 | France | *map* | LT221931 | [24] |
| Flavescence dorée (VF13-380)-M121 | France | *map* | LT222016 | [24] |
| Flavescence dorée (V00-SP5)-M54 | France | *map* | AM384886 | [5] |
| Flavescence dorée (VF06-30-18)-M54 | France | *map* | LT221949 | [24] |
| Flavescence dorée (VI04-Toscana1)-M6 | Italy | *map* | AM384895 | [5] |
| Flavescence dorée (VS-Loza-37)-M51 | Serbia | *map* | LT221946 | [24] |
| Flavescence dorée (VI04-C28)-M3 | Italy | *map* | AM384894 | [5] |
| Flavescence dorée (VI04-188-04)-M12 | Italy | *map* | AM384896 | [5] |
| Corylus avellana (FD-D1448)-M159 | Slovenia | *map* | OX41712 | [28] |
| Palatinate grapevine yellows (EY17-49)-M53 | Germany | *map* | AM384892 | [5] |
| Palatinate grapevine yellows (PGY-B)-M48 | Germany | *map* | AM384893 | [5] |
| Palatinate grapevine yellows (EY38)-M46 | Germany | *map* | AM384891 | [5] |
| Spartium witches'-broom (SI04-S4) | Italy | *map* | AM384899 | [5] |
| Hemp dogbane yellows (HD1) | USA | *map* | AM384902 | [5] |
| Rubus stunt (RUS)-Ca.P.rubi | Italy | *map* | AM384898 | [5] |
| Elm yellows (EY)-Ca.P.ulmi | France | *map* | AM384901 | [5] |
| Alder yellows (ALY1) | Germany | *imp* | MT668499 | [6] |
| Flavescence dorée (CH) | Switzerland | *imp* | CP097583 | [12] |
| Flavescence dorée (FD-D) | Italy | *imp* | MK614707 | [29] |
| Flavescence dorée (FD-C-Piemonte) | Italy | *imp* | KJ402359 | [30] |
| Flavescence dorée (FD70) | France | *imp* | MT668500 | [6] |
| Elm yellows (4120-Ul-SN) | Germany | *imp* | MT668488 | [6] |

| | | | | |
|---|---|---|---|---|
| Elm yellows (1629-Um-BY) | Germany | *imp* | MT668450 | [6] |
| Elm yellows (4157-Ug-SN) | Germany | *imp* | MT668489 | [6] |
| Elm yellows (ULW) | France | *imp* | MT418908 | [6] |
| Jujube witches'-broom (Jwb-nky) | China | *imp* | MG818479 | Gao R., Wang J., Lu X. |
| Alder yellows (periwinkle-maintained ALY) | Italy | *groEL* | MT638097 | [6] |
| Alder yellows (AldY-WA1) | USA | *groEL* | MZ557345 | [31] |
| Elm yellows (6404-Ul-NRW) | Germany | *groEL* | MT638096 | [6] |
| Elm yellows (4120-Ul-SN) | Germany | *groEL* | MT638093 | [6] |
| Elm yellows (ULW) | France | *groEL* | MT418907 | [6] |
| Elm yellows (2906-Ul-ST) | Germany | *groEL* | MT638089 | [6] |
| Elm yellows (3716-Ug-NI) | Germany | *groEL* | MT638090 | [6] |
| Elm yellows (JB0071-C04-CFIA7-2) | France | *groEL* | KJ939992 | [32] |
| Jujube witches'-broom (Jwb-nky) | China | *groEL* | CP025121 | [33] |
| Jujube witches'-broom (Hebei-2018) | China | *groEL* | CP091835 | [34] |

* 16S, 16S rDNA; SR, 16S/23S rDNA spacer region

Table S3. Summary of the pattern types (subgroups) produced by virtual RFLP analysis of ribosomal protein (rp) gene sequences [rp(V) F1A/rp(V)R1A fragments] of the newly recorded alder yellows (ALY) phytoplasma strains in southern Italy and rp sequences retrieved from the GenBank database. Numbers shown in each column represent distinct RFLP types with each enzyme.

| Strain | Genbank Accession. No. | rpV subgroup* | RFLP pattern types | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | *Hpa*II | *Dra*I | *Taq*I | *Alu*I | *Mse*I | *Ssp*I | *Tsp509*I | *Hae*III | *Hha*I |
| ALY-(ALY)** | AY197666 | H | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| ALY-(ALY882)** | AY197662 | K | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 1 |
| ALY-(ALY1068)** | AY197667 | H | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| FD-(FD-C)** | AY197665 | D | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 1 | 1 |
| FD-(FD-D)** | AY197664 | E | 1 | 1 | 2 | 1 | 3 | 2 | 2 | 1 | 1 |
| SpaWB-(SpaWB229)** | AY197672 | L | 1 | 2 | 3 | 1 | 1 | 3 | 3 | 1 | 1 |
| ALY-(AldWB)** | MK806438 | P[a] | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 1 | 1 |
| ALY2413 | PP125318 | H | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| ALY2436 | PP125319 | O[a] | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 |
| ALY2438 | PP125320 | N[a] | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 1 | 1 |
| ALY2450 | PP125321 | S[a] | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 |
| ALY2454 | PP125322 | S[a] | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 |
| ALY2456 | PP125323 | O[a] | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 |
| ALY2459 | PP125324 | H | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| ALY2460 | PP125325 | Q[a] | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 1 |
| ALY2463 | PP125326 | N[a] | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 1 | 1 |
| ALY2465 | PP125327 | D | 2 | 1 | 1 | 1 | 4 | 2 | 2 | 1 | 1 |
| ALY2486 | PP125328 | H | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| ALY2515 | PP125329 | S[a] | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 |
| ALY2518 | PP125330 | H | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| ALY2555 | PP125331 | H | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| ALY2587 | PP125332 | R[a] | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 |
| ALY2588 | PP125333 | O[a] | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 |
| ALY2606 | PP125334 | N[a] | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 1 | 1 |
| ALY2610 | PP125335 | N[a] | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 1 | 1 |
| ALY2611 | PP125336 | R[a] | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 |
| ALY2917 | PP125337 | H | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| ALY2918 | PP125338 | H | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| ALY2921 | PP125339 | R[a] | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 |
| ALY2923 | PP125340 | S[a] | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 |
| ALY2924 | PP125341 | H | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| ALY3016 | PP125342 | O[a] | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 |
| ALY3040 | PP125343 | N[a] | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 1 | 1 |
| ALY3041 | PP125344 | H | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

* rp subgroup designation according to Lee et al. [2] and Martini et al. [35].

** Sequences retrieved from the GenBank database.

[a] Newly identified.

Table S4. Levels of 16S rDNA sequence similarity between the newly recorded alder yellows (ALY) phytoplasma strains in southern Italy.

| Strain | ALY2451 | ALY2455 | ALY2457 | ALY2460 | ALY2461 | ALY2462 | ALY2464 | ALY2518 | ALY2555 | ALY2556 | ALY2614 | ALY2917 | ALY2919 | ALY2924 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ALY2451 | 100 | | | | | | | | | | | | | |
| ALY2455 | 98.5 | 100 | | | | | | | | | | | | |
| ALY2457 | 99.0 | 98.1 | 100 | | | | | | | | | | | |
| ALY2460 | 99.5 | 98.6 | 98.7 | 100 | | | | | | | | | | |
| ALY2461 | 99.0 | 98.1 | 99.1 | 98.7 | 100 | | | | | | | | | |
| ALY2462 | 99.5 | 98.6 | 98.8 | 99.2 | 98.9 | 100 | | | | | | | | |
| ALY2464 | 99.5 | 98.7 | 98.8 | 99.7 | 98.8 | 99.3 | 100 | | | | | | | |
| ALY2518 | 99.4 | 98.3 | 98.5 | 99.5 | 98.5 | 99.1 | 99.5 | 100 | | | | | | |
| ALY2555 | 98.3 | 97.9 | 97.6 | 98.5 | 97.6 | 98.1 | 98.4 | 98.4 | 100 | | | | | |
| ALY2556 | 98.7 | 98.1 | 97.9 | 98.7 | 97.9 | 98.4 | 98.7 | 98.8 | 98.9 | 100 | | | | |
| ALY2614 | 99.6 | 98.7 | 98.7 | 99.5 | 98.7 | 99.3 | 99.7 | 99.3 | 98.2 | 98.5 | 100 | | | |
| ALY2917 | 99.7 | 98.8 | 99.0 | 99.4 | 99.0 | 99.5 | 99.5 | 99.3 | 98.3 | 98.6 | 99.5 | 100 | | |
| ALY2919 | 99.5 | 98.6 | 98.7 | 99.8 | 98.7 | 99.2 | 99.8 | 99.5 | 98.4 | 98.7 | 99.7 | 99.4 | 100 | |
| ALY2924 | 98.5 | 98.2 | 97.7 | 98.4 | 97.7 | 98.8 | 99.4 | 98.3 | 97.9 | 98.1 | 98.2 | 98.6 | 98.4 | 100 |
| ALY-Y16387 | 99.9 | 98.9 | 99.1 | 99.5 | 99.1 | 99.7 | 99.7 | 99.4 | 98.3 | 98.7 | 99.6 | 99.9 | 99.5 | 98.5 |

Table S5. Levels of 16S/23S rDNA spacer region sequence similarity between the newly recorded alder yellows (ALY) phytoplasma strains in southern Italy.

| Strain | ALY2451 | ALY2455 | ALY2457 | ALY2460 | ALY2461 | ALY2462 | ALY2464 | ALY2518 | ALY2555 | ALY2556 | ALY2614 | ALY2917 | ALY2919 | ALY2924 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ALY2451 | 100 | | | | | | | | | | | | | |
| ALY2455 | 99.6 | 100 | | | | | | | | | | | | |
| ALY2457 | 95.8 | 95.4 | 100 | | | | | | | | | | | |
| ALY2460 | 100 | 99.6 | 95.8 | 100 | | | | | | | | | | |
| ALY2461 | 93.5 | 93.2 | 97.0 | 93.5 | 100 | | | | | | | | | |
| ALY2462 | 100 | 99.6 | 95.8 | 100 | 93.5 | 100 | | | | | | | | |
| ALY2464 | 99.6 | 99.2 | 95.4 | 99.6 | 93.2 | 99.6 | 100 | | | | | | | |
| ALY2518 | 95.1 | 94.7 | 91.6 | 95.1 | 89.4 | 95.1 | 94.7 | 100 | | | | | | |
| ALY2555 | 98.5 | 98.1 | 94.3 | 98.5 | 92.0 | 98.5 | 98.9 | 93.5 | 100 | | | | | |
| ALY2556 | 98.9 | 98.5 | 94.7 | 98.9 | 92.4 | 98.9 | 98.5 | 93.9 | 98.9 | 100 | | | | |
| ALY2614 | 98.5 | 98.1 | 95.1 | 98.5 | 92.8 | 98.5 | 98.9 | 93.5 | 97.7 | 97.3 | 100 | | | |
| ALY2917 | 92.4 | 92.0 | 89.0 | 92.4 | 87.8 | 92.4 | 92.0 | 87.5 | 90.9 | 91.3 | 90.9 | 100 | | |
| ALY2919 | 99.6 | 99.2 | 95.4 | 99.6 | 93.2 | 99.6 | 100 | 94.7 | 98.9 | 98.5 | 98.9 | 92.0 | 100 | |
| ALY2924 | 98.1 | 97.7 | 96.6 | 98.1 | 94.3 | 98.1 | 97.7 | 94.7 | 96.6 | 97.0 | 96.6 | 90.5 | 97.7 | 100 |
| ALY-Y16387 | 99.2 | 98.9 | 95.1 | 99.2 | 92.8 | 99.2 | 98.9 | 94.3 | 97.7 | 98.1 | 97.7 | 91.6 | 98.9 | 97.3 |

Table S6. Levels of *rpsV* (*rpl22*) and *rpsC* (*rps3*) gene sequence similarity between the newly recorded alder yellows (ALY) phytoplasma strains in southern Italy.

| Strain | ALY2413 | ALY2436 | ALY2438 | ALY2450 | ALY2454 | ALY2456 | ALY2459 | ALY2460 | ALY2463 | ALY2465 | ALY2486 | ALY2515 | ALY2518 | ALY2555 | ALY2587 | ALY2588 | ALY2606 | ALY2610 | ALY2611 | ALY2917 | ALY2918 | ALY2921 | ALY2923 | ALY2924 | ALY3016 | ALY3040 | ALY3041 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ALY2413 | 100 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ALY2436 | 99.6 | 100 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ALY2438 | 99.5 | 99.6 | 100 | | | | | | | | | | | | | | | | | | | | | | | | |
| ALY2450 | 99.7 | 99.7 | 99.6 | 100 | | | | | | | | | | | | | | | | | | | | | | | |
| ALY2454 | 99.8 | 99.8 | 99.6 | 99.9 | 100 | | | | | | | | | | | | | | | | | | | | | | |
| ALY2456 | 99.6 | 99.8 | 99.8 | 99.7 | 99.8 | 100 | | | | | | | | | | | | | | | | | | | | | |
| ALY2459 | 99.9 | 99.7 | 99.6 | 99.8 | 99.9 | 99.7 | 100 | | | | | | | | | | | | | | | | | | | | |
| ALY2460 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 100 | | | | | | | | | | | | | | | | | | | |
| ALY2463 | 99.4 | 99.6 | 99.9 | 99.5 | 99.6 | 99.7 | 99.5 | 99.6 | 100 | | | | | | | | | | | | | | | | | | |
| ALY2465 | 99.0 | 99.2 | 99.2 | 99.1 | 99.2 | 99.2 | 99.1 | 99.0 | 99.1 | 100 | | | | | | | | | | | | | | | | | |
| ALY2486 | 99.6 | 99.5 | 99.1 | 99.4 | 99.5 | 99.3 | 99.6 | 99.3 | 99.0 | 98.8 | 100 | | | | | | | | | | | | | | | | |
| ALY2515 | 99.6 | 99.6 | 99.5 | 99.7 | 99.8 | 99.6 | 99.7 | 99.5 | 99.4 | 99.2 | 99.5 | 100 | | | | | | | | | | | | | | | |
| ALY2518 | 99.9 | 99.6 | 99.4 | 99.6 | 99.7 | 99.6 | 99.8 | 99.6 | 99.3 | 99.1 | 99.7 | 99.7 | 100 | | | | | | | | | | | | | | |
| ALY2555 | 99.9 | 99.6 | 99.4 | 99.6 | 99.7 | 99.6 | 99.8 | 99.6 | 99.3 | 99.1 | 99.7 | 99.7 | 100 | 100 | | | | | | | | | | | | | |
| ALY2587 | 99.6 | 99.7 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.5 | 99.3 | 99.6 | 99.6 | 99.6 | 99.6 | 100 | | | | | | | | | | | | |
| ALY2588 | 99.3 | 99.5 | 99.3 | 99.4 | 99.5 | 99.5 | 99.4 | 99.3 | 99.2 | 99.0 | 99.1 | 99.5 | 99.4 | 99.4 | 99.4 | 100 | | | | | | | | | | | |
| ALY2606 | 99.2 | 99.4 | 99.6 | 99.5 | 99.4 | 99.4 | 99.3 | 99.4 | 99.5 | 99.1 | 99.0 | 99.4 | 99.3 | 99.3 | 99.5 | 99.2 | 100 | | | | | | | | | | |
| ALY2610 | 99.2 | 99.6 | 99.7 | 99.3 | 99.4 | 99.6 | 99.3 | 99.6 | 99.6 | 99.1 | 99.2 | 99.4 | 99.3 | 99.3 | 99.6 | 99.2 | 99.5 | 100 | | | | | | | | | |
| ALY2611 | 99.8 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 | 99.7 | 99.6 | 99.4 | 99.2 | 99.6 | 99.6 | 99.9 | 99.9 | 99.7 | 99.5 | 99.4 | 99.4 | 100 | | | | | | | | |
| ALY2917 | 99.8 | 99.6 | 99.3 | 99.6 | 99.6 | 99.5 | 99.7 | 99.5 | 99.2 | 99.0 | 99.8 | 99.6 | 99.9 | 99.9 | 99.7 | 99.3 | 99.5 | 99.4 | 99.8 | 100 | | | | | | | |
| ALY2918 | 99.8 | 99.6 | 99.3 | 99.6 | 99.6 | 99.5 | 99.7 | 99.5 | 99.2 | 99.0 | 99.8 | 99.6 | 99.9 | 99.9 | 99.7 | 99.3 | 99.2 | 99.4 | 99.8 | 100 | 100 | | | | | | |
| ALY2921 | 99.6 | 99.6 | 99.3 | 99.4 | 99.5 | 99.5 | 99.6 | 99.5 | 99.2 | 99.0 | 99.6 | 99.5 | 99.7 | 99.7 | 99.7 | 99.3 | 99.2 | 99.4 | 99.8 | 99.8 | 99.8 | 100 | | | | | |
| ALY2923 | 99.6 | 99.6 | 99.5 | 99.9 | 99.8 | 99.6 | 99.7 | 99.5 | 99.4 | 99.2 | 99.5 | 99.8 | 99.7 | 99.7 | 99.6 | 99.5 | 99.6 | 99.4 | 99.6 | 99.6 | 99.6 | 99.5 | 100 | | | | |
| ALY2924 | 99.6 | 99.6 | 99.3 | 99.6 | 99.6 | 99.5 | 99.7 | 99.5 | 99.2 | 99.2 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | 99.3 | 99.2 | 99.4 | 99.6 | 99.8 | 99.8 | 99.6 | 99.6 | 100 | | | |
| ALY3016 | 99.3 | 99.5 | 99.5 | 99.4 | 99.5 | 99.5 | 99.4 | 99.5 | 99.4 | 99.4 | 99.1 | 99.5 | 99.4 | 99.4 | 99.6 | 99.3 | 99.4 | 99.6 | 99.5 | 99.3 | 99.3 | 99.3 | 99.5 | 99.5 | 100 | | |
| ALY3040 | 99.2 | 99.2 | 99.6 | 99.3 | 99.2 | 99.4 | 99.1 | 99.2 | 99.1 | 99.1 | 99.0 | 99.2 | 99.3 | 99.3 | 99.3 | 99.0 | 99.5 | 99.5 | 99.4 | 99.2 | 99.2 | 99.2 | 99.4 | 99.2 | 99.4 | 100 | |
| ALY3041 | 99.7 | 99.6 | 99.2 | 99.5 | 99.6 | 99.4 | 99.6 | 99.4 | 99.1 | 99.1 | 99.0 | 99.6 | 99.8 | 99.8 | 99.6 | 99.2 | 99.1 | 99.3 | 99.7 | 99.9 | 99.9 | 99.7 | 99.6 | 99.2 | 99.4 | 99.3 | 100 |
| ALY-AY197666 | 99.8 | 99.6 | 99.3 | 99.6 | 99.6 | 99.5 | 99.7 | 99.5 | 99.0 | 99.0 | 99.0 | 99.5 | 99.7 | 99.7 | 99.6 | 99.1 | 99 | 99.2 | 99.6 | 99.8 | 99.8 | 99.6 | 99.5 | 99.8 | 99.3 | 99.2 | 99.9 |

Table S7. Levels of *map* gene sequence similarity between the newly recorded alder yellows (ALY) phytoplasma strains in southern Italy.

| Strain | ALY2514 | ALY2515 | ALY2587 | ALY2590 | ALY2599 | ALY2600 | ALY2603 | ALY2604 | ALY2610 | ALY2687 | ALY2689 | ALY2711 | ALY2712 | ALY2735 | ALY2745 | ALY2912 | ALY2917 | ALY2919 | ALY2921 | ALY2924 | ALY3014 | ALY3015 | ALY3016 | ALY3018 | ALY3021 | ALY3040 | ALY3041 | ALY3043 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ALY2514 | 100 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ALY2515 | 99.5 | 100 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ALY2587 | 99.5 | 100 | 100 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ALY2590 | 99.8 | 99.4 | 99.4 | 100 | | | | | | | | | | | | | | | | | | | | | | | | |
| ALY2599 | 99.5 | 100 | 100 | 99.4 | 100 | | | | | | | | | | | | | | | | | | | | | | | |
| ALY2600 | 99.5 | 100 | 100 | 99.4 | 100 | 100 | | | | | | | | | | | | | | | | | | | | | | |
| ALY2603 | 99.5 | 100 | 100 | 99.4 | 100 | 100 | 100 | | | | | | | | | | | | | | | | | | | | | |
| ALY2604 | 99.7 | 99.8 | 99.8 | 99.5 | 99.8 | 99.8 | 99.8 | 100 | | | | | | | | | | | | | | | | | | | | |
| ALY2610 | 99.4 | 99.8 | 99.8 | 99.2 | 99.8 | 99.8 | 99.8 | 99.7 | 100 | | | | | | | | | | | | | | | | | | | |
| ALY2687 | 99.2 | 99.1 | 99.1 | 99.1 | 99.1 | 99.1 | 99.1 | 99.2 | 98.9 | 100 | | | | | | | | | | | | | | | | | | |
| ALY2689 | 99.5 | 100 | 100 | 99.4 | 100 | 100 | 100 | 99.8 | 99.8 | 99.1 | 100 | | | | | | | | | | | | | | | | | |
| ALY2711 | 99.1 | 99.5 | 99.5 | 98.9 | 99.5 | 99.5 | 99.5 | 99.4 | 99.4 | 98.6 | 99.5 | 100 | | | | | | | | | | | | | | | | |
| ALY2712 | 99.4 | 99.8 | 99.8 | 99.2 | 99.8 | 99.8 | 99.8 | 99.7 | 99.7 | 98.9 | 99.8 | 99.4 | 100 | | | | | | | | | | | | | | | |
| ALY2735 | 99.5 | 100 | 100 | 99.4 | 100 | 100 | 100 | 99.8 | 99.8 | 99.1 | 100 | 99.5 | 99.8 | 100 | | | | | | | | | | | | | | |
| ALY2745 | 99.4 | 99.8 | 99.8 | 99.2 | 99.8 | 99.8 | 99.8 | 99.7 | 99.7 | 98.9 | 99.8 | 99.4 | 99.7 | 99.8 | 100 | | | | | | | | | | | | | |
| ALY2912 | 99.4 | 99.8 | 99.8 | 99.2 | 99.8 | 99.8 | 99.8 | 99.7 | 99.7 | 98.9 | 99.8 | 99.4 | 99.7 | 99.8 | 99.7 | 100 | | | | | | | | | | | | |
| ALY2917 | 99.8 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.5 | 99.1 | 99.7 | 99.2 | 99.5 | 99.7 | 99.5 | 99.5 | 100 | | | | | | | | | | | |
| ALY2919 | 100 | 99.5 | 99.5 | 99.8 | 99.5 | 99.5 | 99.5 | 99.7 | 99.4 | 99.2 | 99.5 | 99.1 | 99.4 | 99.5 | 99.4 | 99.4 | 99.8 | 100 | | | | | | | | | | |
| ALY2921 | 100 | 99.5 | 99.5 | 99.8 | 99.5 | 99.5 | 99.5 | 99.7 | 99.4 | 99.2 | 99.5 | 99.1 | 99.4 | 99.5 | 99.4 | 99.4 | 99.8 | 100 | 100 | | | | | | | | | |
| ALY2924 | 99.5 | 100 | 100 | 99.4 | 100 | 100 | 100 | 99.8 | 99.8 | 99.1 | 100 | 99.5 | 99.8 | 100 | 99.8 | 99.8 | 99.7 | 99.5 | 99.5 | 100 | | | | | | | | |
| ALY3014 | 99.5 | 100 | 100 | 99.4 | 100 | 100 | 100 | 99.8 | 99.8 | 99.1 | 100 | 99.5 | 99.8 | 100 | 99.8 | 99.8 | 99.7 | 99.5 | 99.5 | 100 | 100 | | | | | | | |
| ALY3015 | 99.5 | 100 | 100 | 99.4 | 100 | 100 | 100 | 99.8 | 99.8 | 99.1 | 100 | 99.5 | 99.8 | 100 | 99.8 | 99.8 | 99.7 | 99.5 | 99.5 | 100 | 100 | 100 | | | | | | |
| ALY3016 | 99.7 | 99.8 | 99.8 | 99.5 | 99.8 | 99.8 | 99.8 | 99.7 | 99.7 | 98.9 | 99.8 | 99.4 | 99.7 | 99.8 | 99.7 | 99.7 | 99.8 | 99.5 | 99.7 | 99.8 | 99.8 | 99.8 | 100 | | | | | |
| ALY3018 | 99.5 | 100 | 100 | 99.4 | 100 | 100 | 100 | 99.8 | 99.8 | 99.1 | 100 | 99.5 | 99.8 | 100 | 99.8 | 99.8 | 99.7 | 99.5 | 99.5 | 100 | 100 | 100 | 99.8 | 100 | | | | |
| ALY3021 | 99.5 | 100 | 100 | 99.4 | 100 | 100 | 100 | 99.8 | 99.8 | 99.1 | 100 | 99.5 | 99.8 | 100 | 99.8 | 99.8 | 99.7 | 99.5 | 99.5 | 100 | 100 | 100 | 99.8 | 100 | 100 | | | |
| ALY3040 | 99.5 | 100 | 100 | 99.4 | 100 | 100 | 100 | 99.8 | 99.8 | 99.1 | 100 | 99.5 | 99.8 | 100 | 99.8 | 99.8 | 99.7 | 99.5 | 99.5 | 100 | 100 | 100 | 99.8 | 100 | 100 | 100 | | |
| ALY3041 | 99.8 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.5 | 99.1 | 99.7 | 99.2 | 99.5 | 99.7 | 99.5 | 99.5 | 100 | 99.8 | 99.8 | 99.7 | 99.7 | 99.7 | 99.8 | 99.7 | 99.7 | 99.7 | 100 | |
| ALY3043 | 99.2 | 99.1 | 99.1 | 99.1 | 99.1 | 99.1 | 99.1 | 99.2 | 98.9 | 99.4 | 99.1 | 98.6 | 99.2 | 99.1 | 98.9 | 98.9 | 99.1 | 99.2 | 99.2 | 99.1 | 99.1 | 99.1 | 98.9 | 99.1 | 99.1 | 99.1 | 99.1 | |
| ALY-M36-AM384885 | 99.2 | 99.1 | 99.1 | 99.1 | 99.1 | 99.1 | 99.1 | 99.2 | 98.9 | 99.4 | 99.1 | 98.6 | 99.2 | 99.1 | 98.9 | 98.9 | 99.1 | 99.2 | 99.2 | 99.1 | 99.1 | 99.1 | 98.9 | 99.1 | 99.1 | 99.1 | 99.1 | 100 |

Table S8. Summary of the *map* genotypes identified in the newly recorded alder yellows (ALY) phytoplasma strains in southern Italy.

| Strain | Genbank Accession. No. | Host | *Map* genotype* |
|---|---|---|---|
| ALY2514 | PP135471 | *Alnus glutinosa* | M113 |
| ALY2515 | PP135472 | *Alnus glutinosa* | M163[a] |
| ALY2587 | PP135473 | *Alnus cordata* | M163[a] |
| ALY2590 | PP135474 | *Alnus cordata* | M164[a] |
| ALY2599 | PP135475 | *Alnus glutinosa* | M163[a] |
| ALY2600 | PP135476 | *Alnus glutinosa* | M163[a] |
| ALY2603 | PP135477 | *Alnus glutinosa* | M163[a] |
| ALY2604 | PP135478 | *Alnus glutinosa* | M165[a] |
| ALY2610 | PP135479 | *Alnus cordata* | M166[a] |
| ALY2687 | PP135480 | *Alnus cordata* | M167[a] |
| ALY2689 | PP135481 | *Alnus glutinosa* | M163[a] |
| ALY2711 | PP135482 | *Alnus glutinosa* | M168[a] |
| ALY2712 | PP135483 | *Alnus glutinosa* | M169[a] |
| ALY2735 | PP135484 | *Alnus glutinosa* | M163[a] |
| ALY2745 | PP135485 | *Alnus glutinosa* | M170[a] |
| ALY2912 | PP135486 | *Alnus glutinosa* | M171[a] |
| ALY2917 | PP135487 | *Alnus glutinosa* | M173[a] |
| ALY2919 | PP135488 | *Alnus glutinosa* | M113 |
| ALY2921 | PP135489 | *Alnus cordata* | M113 |
| ALY2924 | PP135490 | *Alnus glutinosa* | M163[a] |
| ALY3014 | PP135491 | *Alnus glutinosa* | M163[a] |
| ALY3015 | PP135492 | *Alnus cordata* | M163[a] |
| ALY3016 | PP135493 | *Alnus glutinosa* | M172[a] |
| ALY3018 | PP135494 | *Alnus glutinosa* | M163[a] |
| ALY3021 | PP135495 | *Alnus cordata* | M163[a] |
| ALY3040 | PP135496 | *Alnus cordata* | M163[a] |
| ALY3041 | PP135497 | *Alnus glutinosa* | M173[a] |
| ALY3043 | PP135498 | *Alnus glutinosa* | M36 |

*. *Map* genotype designation according to Arnaud et al. [5]; Malembic-Maher et al. [24]; Zwitter et al., [28]; Krstić et al. [36]; Rigamonti et al., [37].

[a]. Newly identified.

Table S9. Single nucleotide polymorphisms (SNPs) in the *map* gene sequences of newly recorded alder yellows (ALY) phytoplasma strains in southern Italy and reference phytoplasma strains.

| Strain | Genbank Acc. No. | *Map* Genotype* | SNP position | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 11 | 166 | 195 | 216 | 226 | 313 | 372 | 398 | 404 | 456 | 593 | 604 |
| ALY-(AI-04-3-13) | AM384884 | M35 | G | A | G | G | C | C | G | A | G | C | A | C |
| ALY-(AI-AL4) | LT222008 | M113 | G | G | C | G | C | C | G | A | G | C | C | C |
| ALY-(74-08-MNE) | KC188998 | M142 | G | G | G | G | C | C | G | A | G | C | C | C |
| FD-D1448 | OX417124 | M159 | G | G | G | G | C | C | G | A | G | C | C | A |
| ALY | AM384885 | M36 | G | G | G | G | C | C | G | A | G | A | C | C |
| ALY2514 | PP135471 | M113 | G | G | C | G | C | C | G | A | G | C | C | C |
| ALY2515 | PP135472 | M163[a] | G | A | G | G | C | C | G | A | G | C | C | C |
| ALY2587 | PP135473 | M163[a] | G | A | G | G | C | C | G | A | G | C | C | C |
| ALY2590 | PP135474 | M164[a] | G | G | C | G | C | C | A | A | A | C | C | C |
| ALY2599 | PP135475 | M163[a] | G | A | G | G | C | C | G | A | G | C | C | C |
| ALY2600 | PP135476 | M163[a] | G | A | G | G | C | C | G | A | G | C | C | C |
| ALY2603 | PP135477 | M163[a] | G | A | G | G | C | C | G | A | G | C | C | C |
| ALY2604 | PP135478 | M165[a] | G | A | G | G | C | C | G | A | G | C | C | C |
| ALY2610 | PP135479 | M166[a] | G | A | G | G | C | C | T | A | G | C | C | C |
| ALY2687 | PP135480 | M167[a] | G | G | G | T | C | T | G | A | G | C | C | C |
| ALY2689 | PP135481 | M163[a] | G | A | G | G | C | C | G | A | G | C | C | C |
| ALY2711 | PP135482 | M168[a] | A | A | G | G | C | C | G | A | G | C | C | C |
| ALY2712 | PP135483 | M169[a] | G | A | G | G | C | C | G | A | G | A | C | C |
| ALY2735 | PP135484 | M163[a] | G | A | G | G | C | C | G | A | G | C | C | C |
| ALY2745 | PP135485 | M170[a] | G | A | G | G | C | C | G | C | G | C | C | C |
| ALY2912 | PP135486 | M171[a] | G | A | G | G | T | C | G | A | G | C | C | C |
| ALY2917 | PP135487 | M173[a] | G | A | C | G | C | C | G | A | G | C | C | C |
| ALY2919 | PP135488 | M113 | G | G | C | G | C | C | G | A | G | C | C | C |
| ALY2921 | PP135489 | M113 | G | G | C | G | C | C | G | A | G | C | C | C |
| ALY2924 | PP135490 | M163[a] | G | A | G | G | C | C | G | A | G | C | C | C |
| ALY3014 | PP135491 | M163[a] | G | A | G | G | C | C | G | A | G | C | C | C |
| ALY3015 | PP135492 | M163[a] | G | A | G | G | C | C | G | A | G | C | C | C |
| ALY3016 | PP135493 | M172[a] | G | A | C | G | C | C | G | A | G | C | C | C |
| ALY3018 | PP135494 | M163[a] | G | A | G | G | C | C | G | A | G | C | C | C |
| ALY3021 | PP135495 | M163[a] | G | A | G | G | C | C | G | A | G | C | C | C |
| ALY3040 | PP135496 | M163[a] | G | A | G | G | C | C | G | A | G | C | C | C |
| ALY3041 | PP135497 | M173[a] | G | A | C | G | C | C | G | A | G | C | C | C |
| ALY3043 | PP135498 | M36 | G | G | G | G | C | C | G | A | G | A | C | C |

*. *Map* genotype designation according to Arnaud et al. [25]; Malembic-Maher et al. [24]; Zwitter et al., [28]; Krstić et al. [36]; Rigamonti et al., [37].

[a]. Newly identified.

Table S10. Levels of *Imp* gene sequence similarity between the newly recorded alder yellows (ALY) phytoplasma strains in southern Italy.

| Strain | ALY2453 | ALY2462 | ALY2585 | ALY2588 | ALY2600 | ALY2603 | ALY2604 | ALY2605 | ALY2606 | ALY2609 | ALY2610 | ALY2611 | ALY2612 | ALY2614 | ALY2917 | ALY2919 | ALY2921 | ALY2923 | ALY2924 | ALY3014 | ALY3015 | ALY3016 | ALY3017 | ALY3019 | ALY3021 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ALY2453 | 100 | | | | | | | | | | | | | | | | | | | | | | | | |
| ALY2462 | 94.5 | 100 | | | | | | | | | | | | | | | | | | | | | | | |
| ALY2585 | 94.1 | 98.4 | 100 | | | | | | | | | | | | | | | | | | | | | | |
| ALY2588 | 81.0 | 84.4 | 83.8 | 100 | | | | | | | | | | | | | | | | | | | | | |
| ALY2600 | 80.0 | 83.6 | 83.6 | 94.3 | 100 | | | | | | | | | | | | | | | | | | | | |
| ALY2603 | 71.7 | 74.9 | 74.5 | 76.4 | 76.0 | 100 | | | | | | | | | | | | | | | | | | | |
| ALY2604 | 93.7 | 99.0 | 97.4 | 83.8 | 83.4 | 75.8 | 100 | | | | | | | | | | | | | | | | | | |
| ALY2605 | 90.3 | 95.2 | 95.2 | 83.4 | 83.0 | 77.6 | 95.0 | 100 | | | | | | | | | | | | | | | | | |
| ALY2606 | 94.5 | 100 | 98.4 | 84.4 | 83.6 | 74.9 | 99.0 | 95.2 | 100 | | | | | | | | | | | | | | | | |
| ALY2609 | 92.5 | 97.2 | 96.0 | 82.6 | 82.2 | 74.5 | 96.2 | 93.3 | 97.2 | 100 | | | | | | | | | | | | | | | |
| ALY2610 | 79.4 | 82.4 | 82.4 | 82.3 | 95.6 | 75.0 | 82.2 | 82.0 | 82.4 | 81.4 | 100 | | | | | | | | | | | | | | |
| ALY2611 | 93.5 | 99.0 | 97.8 | 83.8 | 83.4 | 74.7 | 98.4 | 95.0 | 99.0 | 96.2 | 82.2 | 100 | | | | | | | | | | | | | |
| ALY2612 | 93.7 | 99.2 | 97.6 | 84.0 | 83.2 | 74.5 | 98.2 | 94.5 | 99.2 | 96.8 | 82.0 | 98.2 | 100 | | | | | | | | | | | | |
| ALY2614 | 93.9 | 99.0 | 97.4 | 84.4 | 83.2 | 74.5 | 98.0 | 94.5 | 99.0 | 96.6 | 82.0 | 98.0 | 99.0 | 100 | | | | | | | | | | | |
| ALY2917 | 93.5 | 98.8 | 97.6 | 83.6 | 84.0 | 74.5 | 97.8 | 94.7 | 98.0 | 95.6 | 82.8 | 97.8 | 97.2 | 97.0 | 100 | | | | | | | | | | |
| ALY2919 | 92.7 | 98.2 | 97.4 | 84.6 | 85.0 | 75.2 | 97.6 | 94.3 | 98.2 | 95.8 | 83.8 | 98.0 | 97.4 | 97.2 | 97.4 | 100 | | | | | | | | | |
| ALY2921 | 81.6 | 84.6 | 84.4 | 93.9 | 96.8 | 76.2 | 84.4 | 84.0 | 84.6 | 83.2 | 95.4 | 84.4 | 84.2 | 84.2 | 85.0 | 85.9 | 100 | | | | | | | | |
| ALY2923 | 80.2 | 84.2 | 84.2 | 92.7 | 95.0 | 75.4 | 84.0 | 84.0 | 84.2 | 83.2 | 93.5 | 84.0 | 83.8 | 83.8 | 84.2 | 85.1 | 94.5 | 100 | | | | | | | |
| ALY2924 | 78.6 | 83.0 | 83.4 | 92.3 | 91.1 | 77.4 | 82.8 | 83.0 | 83.0 | 81.8 | 90.3 | 82.8 | 82.6 | 82.6 | 83.0 | 84.4 | 91.5 | 90.9 | 100 | | | | | | |
| ALY3014 | 92.5 | 97.6 | 96.4 | 83.4 | 83.2 | 76.4 | 97.0 | 94.1 | 97.6 | 94.9 | 82.0 | 97.0 | 96.8 | 96.6 | 96.2 | 96.2 | 84.2 | 83.6 | 83.4 | 100 | | | | | |
| ALY3015 | 79.0 | 82.4 | 82.6 | 94.9 | 92.7 | 76.5 | 81.8 | 82.4 | 82.4 | 81.2 | 91.7 | 81.8 | 82.0 | 82.8 | 82.0 | 83.0 | 91.9 | 92.7 | 90.1 | 81.4 | 100 | | | | |
| ALY3016 | 73.1 | 76.2 | 76.6 | 77.4 | 76.4 | 91.8 | 77.2 | 80.0 | 76.2 | 75.4 | 75.0 | 76.0 | 75.6 | 76.0 | 75.6 | 76.8 | 76.4 | 76.4 | 78.2 | 77.8 | 76.0 | 100 | | | |
| ALY3017 | 70.9 | 73.2 | 73.9 | 76.6 | 75.6 | 93.6 | 74.7 | 77.8 | 73.7 | 73.1 | 74.3 | 73.5 | 73.3 | 73.7 | 73.3 | 74.5 | 75.6 | 75.6 | 77.2 | 75.2 | 75.2 | 96.6 | 100 | | |
| ALY3019 | 93.3 | 98.0 | 96.8 | 83.0 | 82.4 | 73.7 | 97.0 | 94.1 | 98.0 | 95.2 | 81.0 | 97.0 | 97.2 | 97.0 | 96.0 | 96.2 | 83.2 | 82.8 | 81.6 | 95.6 | 81.0 | 75.6 | 73.1 | 100 | |
| ALY3021 | 72.7 | 75.0 | 75.0 | 75.6 | 76.0 | 97.1 | 75.2 | 78.2 | 75.0 | 74.7 | 75.0 | 74.5 | 74.7 | 74.7 | 74.3 | 75.0 | 76.2 | 75.4 | 76.2 | 76.2 | 74.1 | 90.1 | 91.6 | 74.3 | 100 |
| ALY1-MT668499 | 94.3 | 99.8 | 98.2 | 84.2 | 83.4 | 74.7 | 98.8 | 95.0 | 99.8 | 97.0 | 82.0 | 98.8 | 99.0 | 98.8 | 97.8 | 98.0 | 84.4 | 84.0 | 82.8 | 97.4 | 82.2 | 76.0 | 73.5 | 97.8 | 74.9 |

Table S11. Levels of *groEL* gene sequence similarity between the newly recorded alder yellows (ALY) phytoplasma strains in southern Italy.

| Strain | ALY2414 | ALY2453 | ALY2462 | ALY2585 | ALY2588 | ALY2600 | ALY2603 | ALY2604 | ALY2605 | ALY2606 | ALY2609 | ALY2610 | ALY2611 | ALY2612 | ALY2917 | ALY2919 | ALY2921 | ALY2923 | ALY2924 | ALY3014 | ALY3015 | ALY3016 | ALY3017 | ALY3019 | ALY3021 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ALY2414 | 100 | | | | | | | | | | | | | | | | | | | | | | | | |
| ALY2453 | 98.7 | 100 | | | | | | | | | | | | | | | | | | | | | | | |
| ALY2462 | 99.5 | 98.2 | 100 | | | | | | | | | | | | | | | | | | | | | | |
| ALY2585 | 99.9 | 98.6 | 99.6 | 100 | | | | | | | | | | | | | | | | | | | | | |
| ALY2588 | 99.7 | 98.7 | 99.5 | 99.9 | 100 | | | | | | | | | | | | | | | | | | | | |
| ALY2600 | 99.6 | 98.3 | 99.9 | 99.7 | 99.6 | 100 | | | | | | | | | | | | | | | | | | | |
| ALY2603 | 99.7 | 98.5 | 99.5 | 99.9 | 99.7 | 99.6 | 100 | | | | | | | | | | | | | | | | | | |
| ALY2604 | 99.6 | 98.3 | 99.4 | 99.7 | 99.6 | 99.5 | 99.6 | 100 | | | | | | | | | | | | | | | | | |
| ALY2605 | 99.6 | 98.6 | 99.4 | 99.7 | 99.9 | 99.5 | 99.6 | 99.5 | 100 | | | | | | | | | | | | | | | | |
| ALY2606 | 99.6 | 98.6 | 98.4 | 99.7 | 99.9 | 99.5 | 99.6 | 99.5 | 100 | 100 | | | | | | | | | | | | | | | |
| ALY2609 | 99.9 | 98.6 | 99.4 | 99.7 | 99.9 | 99.5 | 99.6 | 99.5 | 100 | 100 | 100 | | | | | | | | | | | | | | |
| ALY2610 | 99.5 | 98.6 | 99.4 | 100 | 99.9 | 99.7 | 99.9 | 99.7 | 99.7 | 99.7 | 99.7 | 100 | | | | | | | | | | | | | |
| ALY2611 | 99.5 | 98.5 | 99.5 | 99.6 | 99.7 | 99.4 | 99.5 | 99.4 | 99.9 | 99.9 | 99.9 | 99.6 | 100 | | | | | | | | | | | | |
| ALY2612 | 99.7 | 98.5 | 99.5 | 99.9 | 99.7 | 99.6 | 99.7 | 99.6 | 99.9 | 99.9 | 99.9 | 99.9 | 99.7 | 100 | | | | | | | | | | | |
| ALY2917 | 99.7 | 98.5 | 99.5 | 99.9 | 99.7 | 99.6 | 99.7 | 99.6 | 99.9 | 99.9 | 99.9 | 99.9 | 99.7 | 100 | 100 | | | | | | | | | | |
| ALY2919 | 99.9 | 98.6 | 99.6 | 100 | 99.9 | 99.7 | 99.9 | 99.7 | 99.7 | 99.7 | 99.7 | 100 | 99.6 | 99.9 | 99.9 | 100 | | | | | | | | | |
| ALY2921 | 99.5 | 98.5 | 99.2 | 99.6 | 99.7 | 99.4 | 99.5 | 99.6 | 99.9 | 99.9 | 99.9 | 99.6 | 99.7 | 99.7 | 99.7 | 99.6 | 100 | | | | | | | | |
| ALY2923 | 99.4 | 98.1 | 99.4 | 99.2 | 99.1 | 99.2 | 99.1 | 99.0 | 99.2 | 99.2 | 99.2 | 99.2 | 99.4 | 99.4 | 99.4 | 99.2 | 99.1 | 100 | | | | | | | |
| ALY2924 | 99.6 | 98.3 | 99.4 | 99.7 | 99.6 | 99.5 | 99.6 | 99.5 | 99.7 | 99.7 | 99.7 | 99.7 | 99.6 | 99.9 | 99.9 | 99.7 | 99.6 | 99.2 | 100 | | | | | | |
| ALY3014 | 99.5 | 98.5 | 99.7 | 99.6 | 99.7 | 99.6 | 99.5 | 99.4 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.5 | 99.5 | 99.6 | 99.5 | 99.4 | 99.4 | 100 | | | | | |
| ALY3015 | 99.7 | 98.5 | 99.5 | 99.9 | 99.7 | 99.6 | 99.7 | 99.6 | 99.9 | 99.9 | 99.9 | 99.9 | 99.7 | 100 | 100 | 99.9 | 99.7 | 99.4 | 99.9 | 99.5 | 100 | | | | |
| ALY3016 | 99.7 | 98.7 | 99.5 | 99.9 | 100 | 99.6 | 99.7 | 99.6 | 99.9 | 99.9 | 99.9 | 99.9 | 99.7 | 99.7 | 99.7 | 99.9 | 99.7 | 99.1 | 99.6 | 99.7 | 99.7 | 100 | | | |
| ALY3017 | 99.6 | 98.6 | 99.4 | 99.7 | 99.9 | 99.5 | 99.6 | 99.5 | 100 | 100 | 100 | 99.7 | 99.9 | 99.5 | 99.9 | 99.7 | 99.9 | 99.2 | 99.7 | 99.6 | 99.9 | 99.9 | 100 | | |
| ALY3019 | 99.1 | 98.1 | 99.8 | 99.2 | 99.4 | 99.0 | 99.1 | 99.2 | 99.2 | 99.2 | 99.2 | 99.2 | 99.1 | 99.1 | 99.1 | 99.2 | 99.1 | 98.2 | 99.0 | 99.1 | 99.1 | 99.4 | 99.2 | 100 | |
| ALY3021 | 99.7 | 98.7 | 99.5 | 99.9 | 100 | 99.6 | 99.7 | 99.6 | 99.9 | 99.9 | 99.9 | 99.9 | 99.7 | 99.7 | 99.7 | 99.9 | 99.7 | 98.1 | 99.6 | 99.7 | 99.7 | 100 | 99.9 | 99.4 | 100 |
| ALY-MT638097 | 99.0 | 97.7 | 99.2 | 98.8 | 98.7 | 99.1 | 98.7 | 98.6 | 98.8 | 98.8 | 98.8 | 98.8 | 99.0 | 99.0 | 99 | 98.8 | 98.7 | 98.6 | 98.8 | 99 | 99 | 98.7 | 98.8 | 98.1 | 98.7 |

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