Table S1. Comparison between the Fii map and *F. × ananassa* (DA×MO) map. For each marker in common between the maps, the Fii LG and map position (cM) is provided along with Array marker type, and DA×MO map linkage group homeologue and associated map position (cM).

Table S2. Linkage map marker information. For each of the 4173 markers, the Fii LG, map position (cM) and Bin ID are provided along with the marker ID and the marker sequence tag. The last three columns provide information as described and displayed on the synteny Figures S1.0–1.7 and colinearity Figures S2.1–2.7, in which x = synteny or colinear, respectively. In the colinearity column, lack of synteny is indicated with NR = not represented, O = other for non-corresponding linkage group, LG0 for FvH LG0, and scf = FvH scaffold.

Figure S1.0. Legend for Figures S1.1–S1.7 synteny comparison of *F. iinumae* LGs to PCs of FvH and Fvb. Panel A displays the color and symbol coding for the Fii PC and FvH and Fvb PC comparisons. Panel B displays the icon and color code for the disposition of markers not otherwise located either on the FvH or the Fvb assembly. Panel C provides cutaways from Figure S1.1 to display the correspondence between the assemblies of FvH (a. left panel cut-away) and the Fvb (b. right panel cut-away).

In Figures S1.1–S1.7, the Fii LGs map lengths are in cM. The FvH and Fvb PC physical map assemblies are in 10 kbps increments, and the total length of each assembly is provided in Mbps. In these Figures, FvH (left panel) and Fvb (right panel) prefixes are abbreviated, such that FvH-PC1 becomes H-PC1 and Fvb-PC1 becomes b-PC1, etc. In the Circos diagrams, the links are concordant when they connect a point on an Fii LG arc to a point on a corresponding FvH or Fvb PC arc, while they are discordant when they connect a point on an Fii LG arc to a point on a non-corresponding FvH or Fvb PC arc or to a button within a color-coded oval. Color-coded buttons on discordant links provide marker identities as cross-referenced to assembly marker information provided in Supplementary Table S1. In the left panels of Figures S1.1-S1.7, each button color corresponds to the color of a specific arc or oval in the right panel, while in the right panel, each button color corresponds to the color of a specific arc or oval in the left panel. The color-coded white and yellow ovals represent marker assignments to the FvH-PC0 and FvH scaffold assembly (scf) assemblies, respectively, while the gray oval designates Fii markers that are not found as blastn hits in the Fvb assembly.

Figure S1.1. Synteny relationships of markers on Fii LG1. Of 472 markers on Fii LG1, 420, and 426 locate to FvH-PC1 (left panel) and Fvb-PC1 (right panel), respectively, of which 386 are in common between FvH and Fvb. Of 52 Fii LG1 markers not located on FvH-PC1, one (button O1) locates to the FvH scaffold assembly; four (buttons P1, Q1 and P2) locate to FvH-PC0; 45 (buttons C1, D1, E1, two F1s, G6, H1, K23, L2, M1, N1, and J6) locate to FvH PCs other than PC0 and PC1; and two GBS markers (not shown) are absent from the FvH scaffolds and FvH and Fvb PCs. All 46 markers not located on Fvb-PC1 (right panel) are GBS markers, of which 38 are absent from the Fvb assembly. Of these 38 absent markers, 33 (button B33) are syntetic between Fii and FvH, one marker (button D1) is located on FvH-PC3, and two (F1 buttons) on FvH-PC4, one (button O1) on FvH-scf, and one (button Q1) FvH-PC0. Thirty-seven markers (buttons G6, K23, J6, and L2) that are non-syntenic in FvH locate to Fvb-PC1, while one (button A1) that is non-syntenic with Fvb is syntenic with FvH. Five Fii LG1 markers (buttons C1, E1, H1, M1, N1) that are non-syntenic to both FvH and Fvb are syntenic between
the FvH and Fvb PCs. The boxed sections indicate cutaways displayed and described in the 
Figure S1.0 key.

**Figure S1.2. Synteny relationships of markers on Fii LG2.** Of 595 markers on Fii LG2, 
548, and 537 locate to FvH-PC2 and Fvb-PC2, respectively, of which 507 are in common 
between FvH and Fvb. Three Fii LG2 GBS markers are absent in both FvH and Fvb (not shown). 
Forty-five Fii markers are located on FvH-PCs other than FvH-PC2, while four Fii markers 
(buttons U1, V3) are located on FvH-PC0 and none are located on H-scf. The three (button V3) 
markers located on FvH PC0 are syntenic on Fvb-PC2. Of the 49 Fii markers absent from the 
Fvb assembly, 39 markers (buttons B1, C38) are syntenic in FvH, while the remaining 10 
markers (buttons A1, three F1s, K1, M1, two Q1s, S1, U1) are not syntenic with FvH-PC2 but 
are scattered throughout FvH PCs. Twenty-seven markers (buttons G2, H8, N2, O3, O8, P1, and 
P3) non-syntenic in FvH are syntenic in the Fvb assembly, while two markers (D1, E1) non-
syntenic in Fvb are syntenic in FvH. A total of three markers (buttons L1, R1, and T1) syntenic 
between FvH and Fvb are not syntenic with Fii and three markers (E1, D1, J1) are not syntenic 
between Fii, FvH and Fvb.

**Figure S1.3. Synteny relationships of markers on Fii LG3.** Of 657 markers on Fii LG3, 
578, and 593 locate to FvH-PC3 and Fvb-PC3, respectively, with 555 in common between FvH 
and Fvb. Seven GBS markers are absent in both FvH and Fvb (not shown). Sixty-three Fii 
markers locate to FvH-PCs other than FvH-PC3, while four locate to H-PC0 and five to FvH-scf. 
One (button V1) marker locates to FvH PC0, but is syntenic with Fvb PC3. None of five markers 
located on FvH scaffolds locate to FvH-PC3. Twenty-seven markers locate to Fvb-PCs other than 
PC3, while 30 are absent in Fvb. Of 30 markers not located in Fvb, 20 (button H20) are syntenic 
in FvH, six (buttons D1, P1, S3, S1) are not syntenic in FvH, one marker (button Z1) is located 
on PC0 and three (button Y3) are located to FvH scfs. Thirty-seven markers (buttons B12, C6, 
O3, O7, T9) non-syntenic in FvH are syntenic in Fvb, while three (buttons J2, K1) syntenic in 
FvH are non-syntenic in Fvb. None of the LG3 markers non-syntenic in both FvH and Fvb are 
located on discrepant FvH and Fvb PCs. Twenty markers (buttons A1, E1, F2, G1, L3, M1, N6, 
Q1, R4) syntenic between FvH and Fvb are not syntenic with Fii.

**Figure S1.4. Synteny relationships of markers on Fii LG4.** Of the 496 markers on Fii 
LG4, 498, and 535 are located on FvH-PC4 and Fvb-PC4, respectively, of which 480 are in 
common between FvH and Fvb. Five Fii LG4 GBS markers are not present in either FvH or Fvb 
(not shown). Twenty-five Fii markers are located on FvH-PCs other than FvH-PC4, while no Fii 
markers are located on FvH-PC0 and 28 are located on FvH-scf. Twenty-one Fii markers are 
located in Fvb-PCs other than FvH-PC4. Of the 31 Fii markers not located in the Fvb assembly, 
20 markers (button J20) are syntenic to FvH PC4, three (button R3) are located on FvH-PC6, and 
eight markers (W8) are located on FvH scaffolds. Twenty-one markers (buttons B1, D1, E1, N2, 
P4, and X20) non-syntenic in FvH are syntenic in the Fvb assembly, while eight markers 
(buttons H3, K1, K2, L1, and M1) syntenic in FvH are non-syntenic in the Fvb assembly. Three 
Fii LG4 markers (buttons A1, S1, and T1) that are not syntenic in FvH and Fvb are located on 
discrepant FvH and Fvb PCs. A total of ten markers (buttons two C1s, F1, two G1s, O1, Q1, U2, 
and V1) syntenic between FvH and Fvb are not syntenic with Fii.

**Figure S1.5. Synteny relationships of markers on Fii LG5.** Of the 576 markers on Fii 
LG5, 498, and 535 are located on FvH-PC5 and Fvb-PC5, respectively, of which 480 are in 
common between FvH and Fvb. Four Fii LG5 GBS markers are not present in either FvH or Fvb 
(not shown). Seventy Fii markers are located on FvH-PCs other than FvH-PC5, while one and
three Fii markers are located on FvH-PC0 and FvH-scf, respectively. Ten Fii markers are located on Fvb-PCs other than Fvb-PC5. Of the 27 Fii markers not located in Fvb, 18 (buttons O18) are syntenic in FvH, six markers (buttons E1, K1, two S1, and two U1) are not syntenic in FvH, and three of the Fii markers (button X3) are located on FvH scaffolds. Fifty-five markers (buttons A1, A5, two B1, C1, D5, F1, G35, H4, and R1) non-syntenic in FvH are syntenic in the Fvb assembly, while no markers non-syntenic in the Fvb assembly are syntenic in FvH. None of the Fii LG5 markers non-syntenic in FvH and Fvb are located on discrepant FvH and Fvb PCs. A total of nine markers (buttons J1, L1, M1, P1, Q1, T1, and V3) syntenic between FvH and Fvb are not syntenic with Fii.

Figure S1.6. Synteny relationships of markers on Fii LG6. Of the 938 markers on Fii LG6, 803, and 865 located to FvH-PC6 and Fvb-PC6, respectively, of which 757 are in common between FvH and Fvb. Three Fii LG6 GBS markers are absent in both FvH and Fvb (not shown). One hundred thirty Fii LG6 markers are located on FvH-PCs other than FvH-PC6, while no Fii marker is located on FvH-PC0 and two are on FvH-scf. Fifteen Fii markers are located on Fvb-PCs other than Fvb-PC6. Of the 55 Fii markers not located in Fvb, 41 (button V41) are syntenic in FvH, twelve markers (buttons A2, H2, L1, L2, Q1, and four X1s) are not syntenic in FvH, and two (button Y2) are located in FvH-scf. Of the 130 markers non-syntenic in FvH, 108 markers (buttons B13, B30, C2, C3, J3, K11, M15, two N2, N4, M5, M15, and M18) are syntenic in the Fvb assembly, while five markers (buttons U2, T3) non-syntenic in the Fvb assembly are syntenic in FvH. None of the Fii LG6 markers non-syntenic in FvH and Fvb are located on discrepant FvH and Fvb PCs. A total of ten markers (buttons two F1, G1, G2, O1, P1, R1, S1, and W1) syntenic between FvH and Fvb are not syntenic with Fii.

Figure S1.7. Synteny relationships of markers on Fii LG7. Of the 439 markers on Fii LG7, 417, and 415 are located on FvH-PC7 and Fvb-PC7, respectively, of which 398 are in common between FvH and Fvb. One Fii LG7 GBS marker is not present in either FvH or Fvb (not shown). Twenty-one Fii markers are located on FvH-PCs other than FvH-PC7, while no Fii markers are located on FvH-PC0 or FvH-scf. All 19 Fii markers (buttons K18 and J1) not located in Fvb are syntenic in FvH. Seventeen markers (buttons A1, D11, E2, and H3) non-syntenic in FvH are syntenic in the Fvb assembly, while none of the markers non-syntenic in the Fvb assembly are syntenic in FvH. None of the Fii LG7 markers non-syntenic in either FvH or Fvb are located on discrepant FvH and Fvb PCs. The four Fii markers (buttons B1, C1, F1, G1) non-syntenic with Fvb-PC7, are syntenic between FvH and Fvb.

Figure S2.1. Colinearity of Fii LG1 with PC1s of FvH and Fvb. Sites SM-1, SM-2, and SM-3 mark the locations of single marker (SM) discrepancies in FvH (left panel), and SM-1 remains unresolved in Fvb (right panel). Rearrangement zones RZ-1a, 1b, and 1c indicate putatively artifactual inversions in FvH that are resolved in Fvb. Rearrangement RZ-2 involving the centromeric region (bowtie icon) indicates numerous discrepancies in FvH that are largely but not entirely resolved in Fvb.

Figure S2.2. Colinearity of Fii LG2 with PC2s of FvH and Fvb. Rearrangement zone RZ-1 involving the centromeric region (bowtie icon) indicates numerous artifactual inversions in FvH (left panel) which largely remain and are subdivided (RZ-1a and RZ-1b in Fvb (right panel). RZ-2 indicates three artifactual inversions in FvH that are resolved in Fvb.

Figure S2.3. Colinearity of Fii LG3 with PC3s of FvH and Fvb. Sites SM-1 and SM2 are indicative of single marker (SM) discrepancies in FvH (left panel) which are resolved in Fvb.
Rearrangement zones RZ-1 and RZ-3 indicative of multiple inversions in FvH are entirely resolved in Fvb. RZ-2a, RZ-2b, and RZ-2c involving the centromeric region (bowtie icon) is not entirely resolved in Fvb.

**Figure S2.4. Colinearity of Fii LG4 with PC1s of FvH and Fvb.** Sites SM-1, SM-2, and SM-3 are sites of single marker (SM) discrepancies in FvH (left panel), and SM-1 and SM-2 remain unresolved in Fvb (right panel). Rearrangement zones, RZ-1a and RZ-1b, involving the centromeric region (bowtie icon) are indicative of numerous rearrangements in FvH of which only a portion of RZ-1b remains unresolved in Fvb. RZ-2 is indicative of rearrangements in FvH that are completely resolved in Fvb.

**Figure S2.5. Colinearity of Fii LG5 with PC1s of FvH and Fvb.** Site SM-1 is indicative of a single marker rearrangement in Fvb (right panel) that non-syntenous in FvH. Rearrangement zone RZ-1 is indicative of numerous localized inversions in FvH, which are resolved in Fvb. Rearrangement zones, RZ-2a, b, and c, involving the centromeric region (bowtie icon) are indicative of numerous rearrangements in FvH and a portion of RZ-2a and all of RZ-2b that remain unresolved in Fvb.

**Figure S2.6. Colinearity of Fii LG6 with PC1s of FvH and Fvb.** Sites SM-1, SM-2, and SM-6 are the locations of single marker discrepancies in FvH (left panel) and Fvb (right panel). The SM-3 site of single marker discrepancy in Fvb (right panel) is non-syntenic in FvH. SM-4 and SM-5 are sites of single marker discrepancies in Fvb, which are colinear in FvH. Rearrangement region RZ-1 is indicative of multiple inversions in FvH and is largely resolved in Fvb. Rearrangement region, RZ-2a and RZ-2b, involving the centromeric region (bowtie icon), are indicative of multiple inversions in FvH and are almost entirely resolved in Fvb. RZ-3 is indicative of multiple inversions in FvH and is entirely resolved in Fvb.

**Figure S2.7. Colinearity of Fii LG7 with PC1s of FvH and Fvb.** Site SM-1 is a site of a single marker (SM) discrepancy in Fvb (right panel) that is non-syntenic in FvH. Site SM-2 is a site of a single marker discrepancy in FvH and Fvb. Rearrangement zone RZ-1, the site of the centromeric region (bowtie icon), is indicative of multiple inversions and rearrangements in FvH that are entirely resolved in Fvb. RZ-2 and RZ-3 are indicative of rearrangements in FvH that are entirely resolved in Fvb.
### Table A

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### Diagram B

- **FvH v1.1 PC0**
- **FvH scf v1.1 scaffolds**
- **Fvb ngh (No good hits)**

### Diagram C

#### a. left panel cut-away

- **H-PC1**
- **B33**
- **A1**
- **ID link FvH to Fvb**
- **Number of markers**

#### b. right panel cut-away

- **b-PC6**
- **B33**
- **D1**
- **Q1**
- **F2**
- **O1**
- **A1**
- **ID link FvH to Fvb**
- **Number of markers**
a. Syntenic comparison of Fii LG1 with FvH-PCs (Circos arcs) and Fvb-PCs (buttons)
b. Syntenic comparison of Fii LG1 with Fvb-PCs (Circos arcs) and FvH-PCs (buttons)
a. Synteny of Fii LG3 with FvH-PCs (Circos arcs), and Fvb-PCs (buttons)

b. Synteny of Fii LG3 with Fvb-PCs (Circos arcs), and FvH-PCs (buttons)
a. Synteny of Fii LG6 with FvH-PCs (Circos arcs), and Fvb-PCs (buttons)

b. Synteny of Fii LG6 with Fvb-PCs (Circos arcs), and FvH-PCs (buttons)
a. Synteny of Fii LG7 with FvH-PCs (Circos arcs), and Fvb-PCs (buttons)

b. Synteny of Fii LG7 with Fvb-PCs (Circos arcs), and FvH-PCs (buttons)