

# Experiments

## Exp 1. How good is the last iteration of the MCEM

```
time = proc.time()
n_sim = 1000
n_trees = 10
MP = matrix(nrow=n_sim,ncol=3)
RP = matrix(nrow=n_sim,ncol=3)
p = proc.time()
for(i in 1:n_sim){
  est = sim.est(n_trees=n_trees,pars=c(0.8,0.1,40),seed=i)
  RP[i,] = est$real
  MP[i,] = est$est
}
get.time(time)

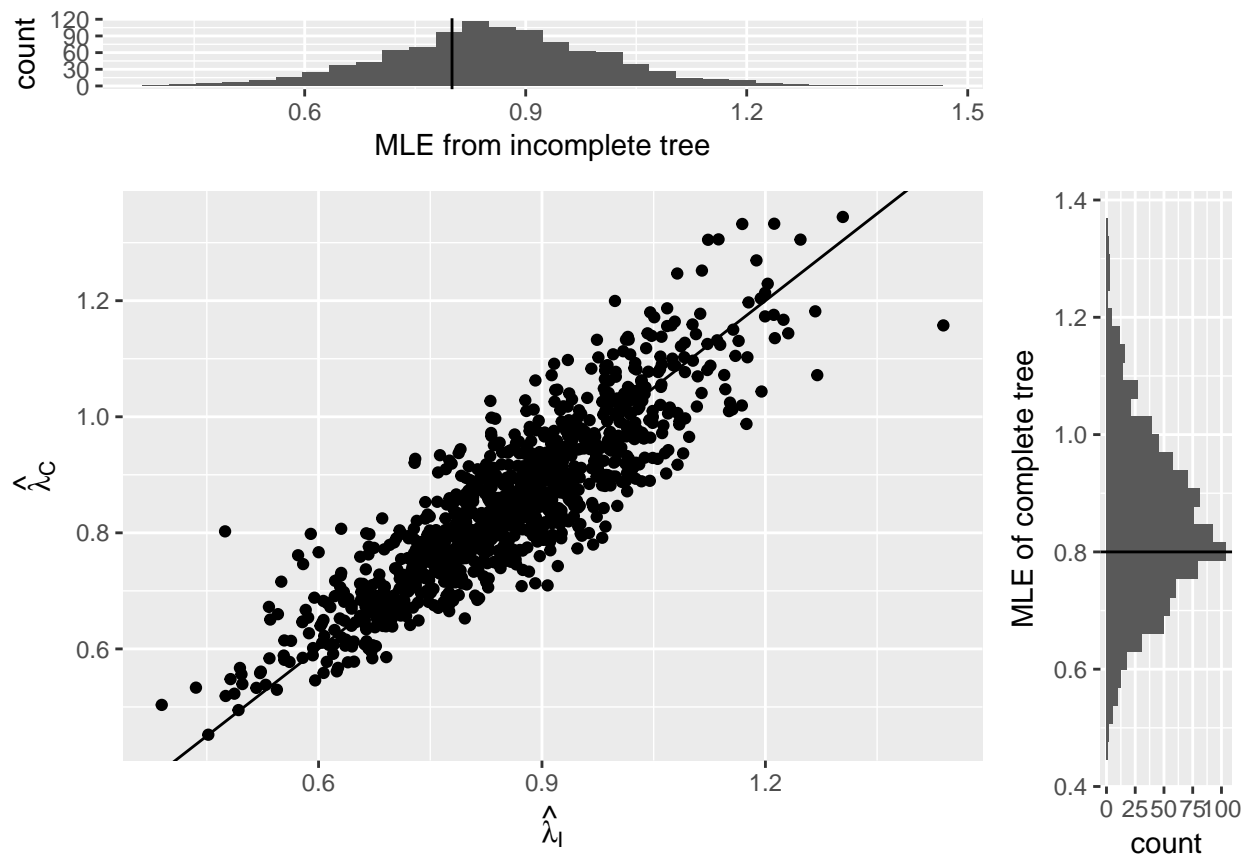
## elapsed
## 1067.92

get.time(time)

## elapsed
## 1067.975

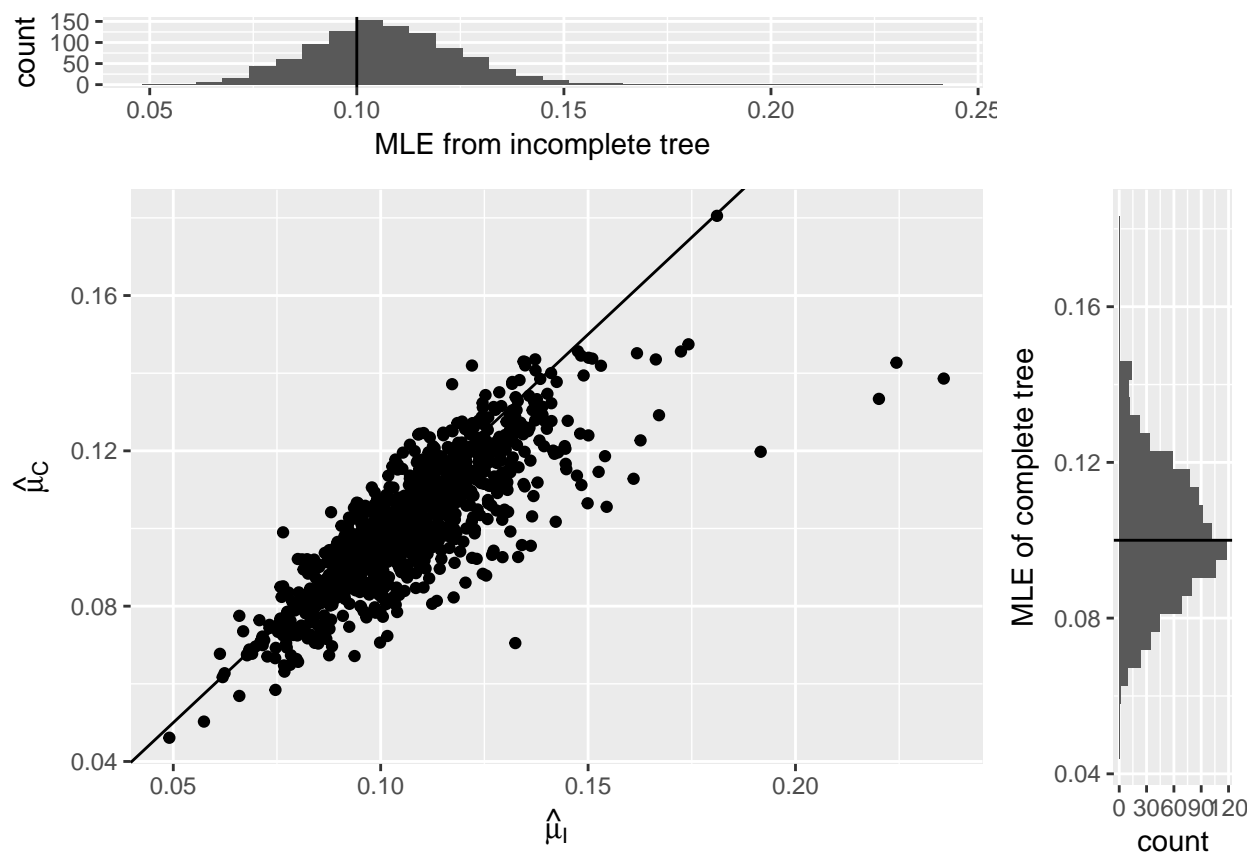
dmea::par_est_vis(P=MP,par=1,PR=RP)

## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```



```
dmea::par_est_vis(P=MP,par=2,PR=RP)
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

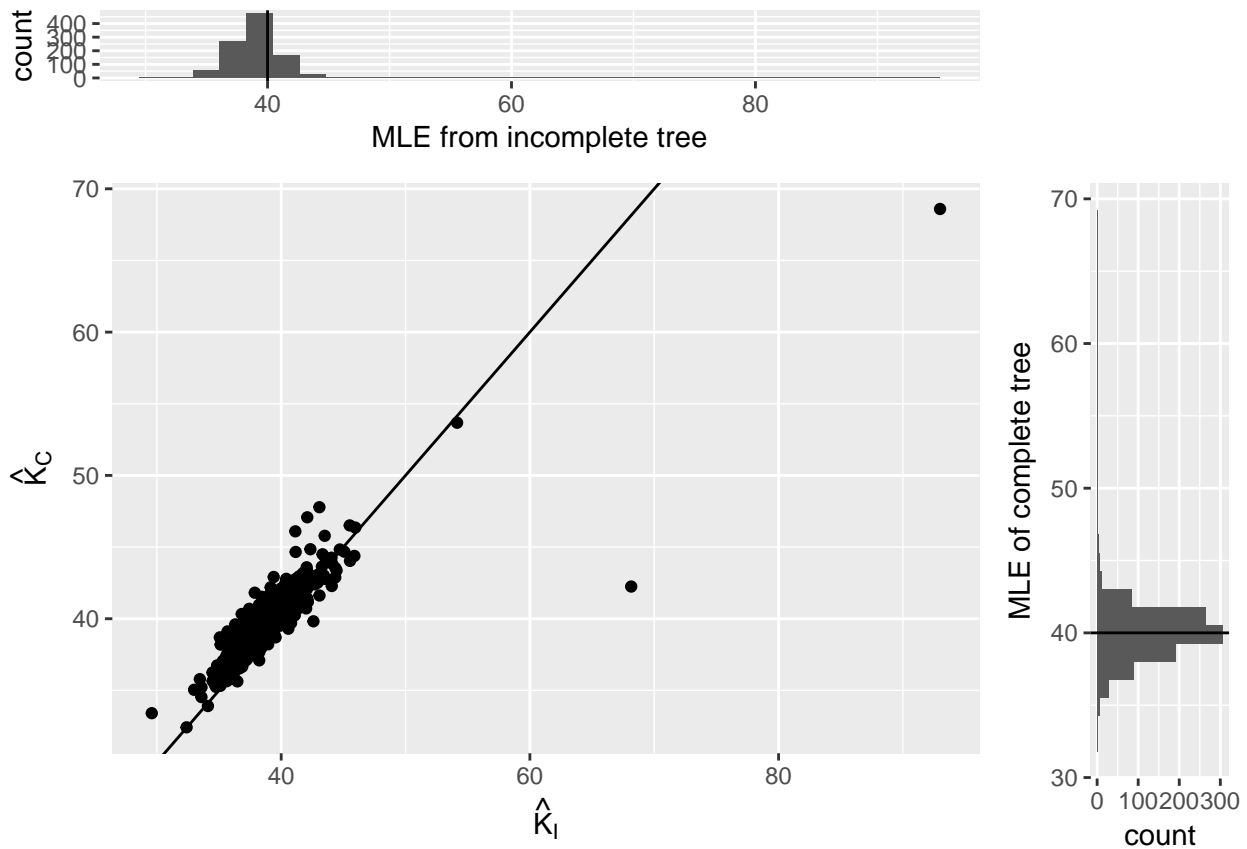


```
dmea::par_est_vis(P=MP,par=3,PR=RP)
```

```
## [1] "0.003 proportion of data was excluded for vizualization purposes"
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```



```
get.time(time)
```

```
## elapsed
## 1072.548
```

```
summary(MP)
```

```
##           V1           V2           V3
## Min.      :0.3894   Min.    :0.04906   Min.     :24.74
## 1st Qu.:0.7670   1st Qu.:0.09504   1st Qu.:37.76
## Median :0.8542   Median :0.10580   Median :38.93
## Mean    :0.8558   Mean    :0.10722   Mean    :39.04
## 3rd Qu.:0.9468   3rd Qu.:0.11806   3rd Qu.:40.13
## Max.    :1.4390   Max.    :0.23574   Max.    :92.99
```

```
summary(RP)
```

```
##           V1           V2           V3
## Min.      :0.4521   Min.    :0.04611   Min.     :3.200e+01
## 1st Qu.:0.7557   1st Qu.:0.08961   1st Qu.:3.900e+01
## Median :0.8363   Median :0.10023   Median :4.000e+01
## Mean    :0.8497   Mean    :0.10096   Mean    :2.314e+11
## 3rd Qu.:0.9381   3rd Qu.:0.11241   3rd Qu.:4.100e+01
## Max.    :1.3443   Max.    :0.18053   Max.    :2.314e+14
```

$\mu_0 = 0.2$

```
time = proc.time()
n_sim = 1000
n_trees = 10
MP = matrix(nrow=n_sim,ncol=3)
RP = matrix(nrow=n_sim,ncol=3)
p = proc.time()
for(i in 1:n_sim){
  est = sim.est(n_trees=n_trees,pars=c(0.8,0.2,40),seed=i)
  RP[i,] = est$real
  MP[i,] = est$est
}
get.time(time)
```

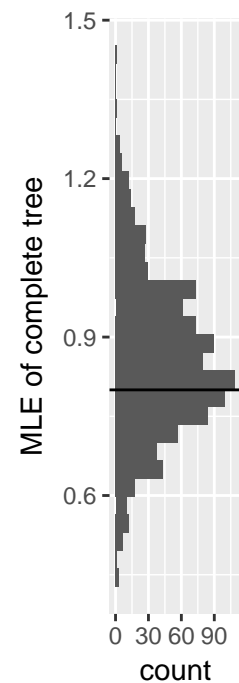
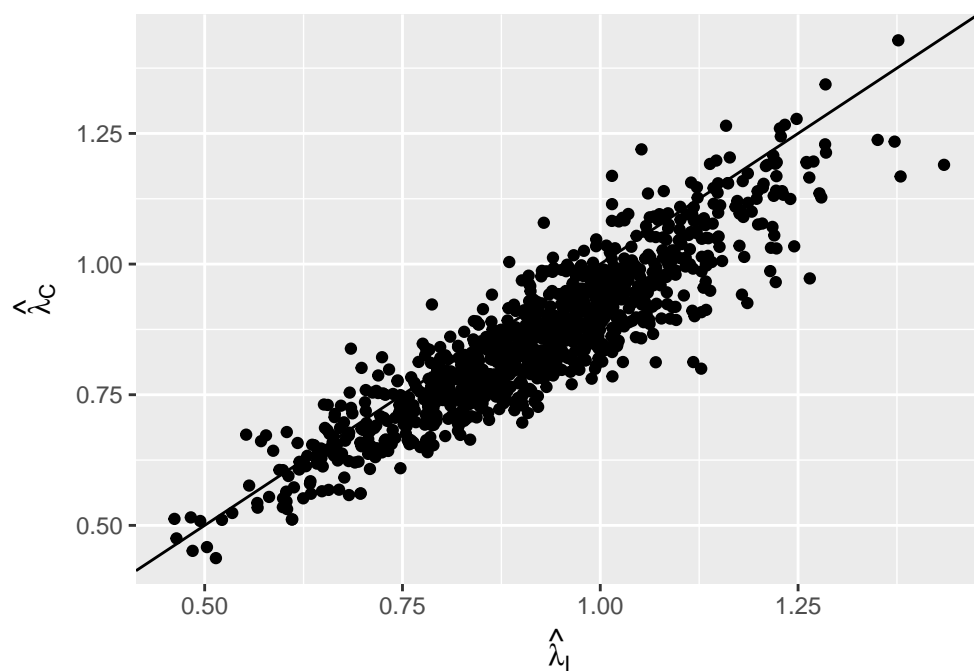
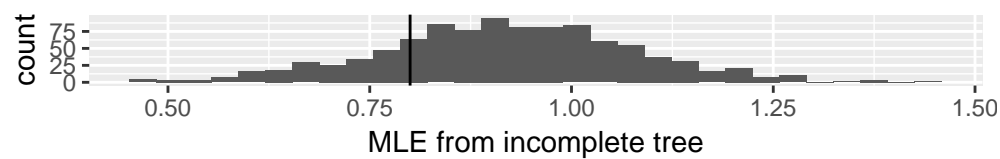
```
## elapsed
## 1865.548
```

```
get.time(time)
```

```
## elapsed
## 1865.562
```

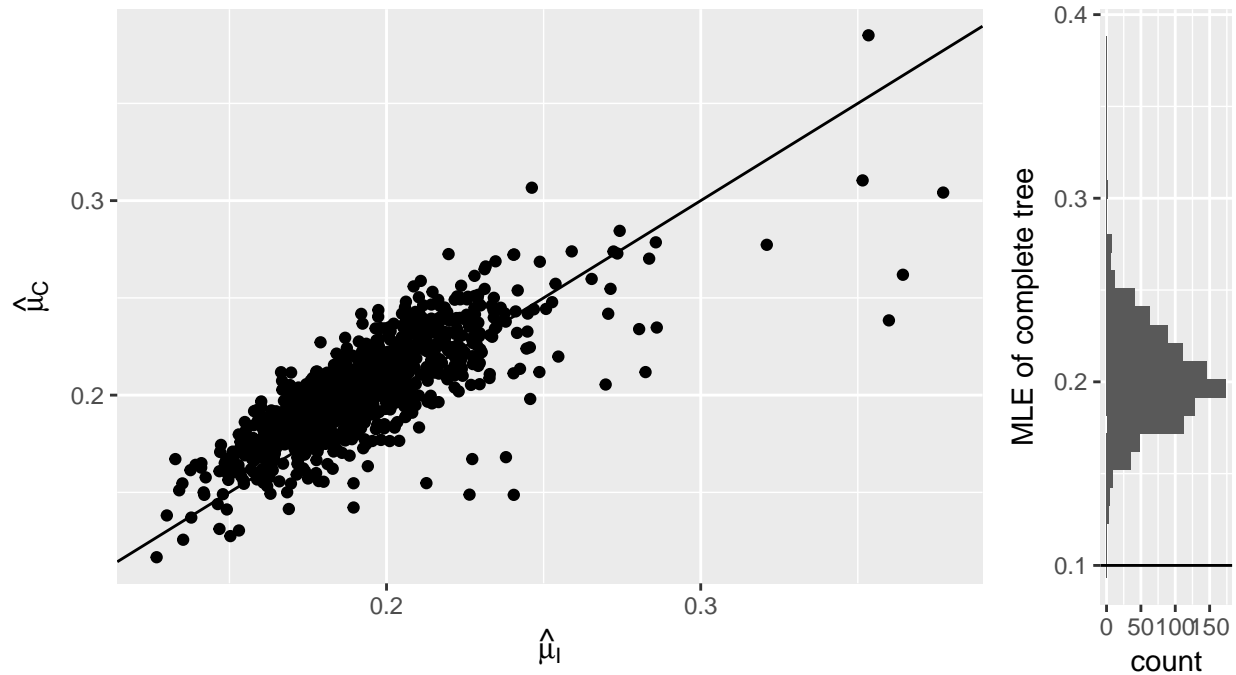
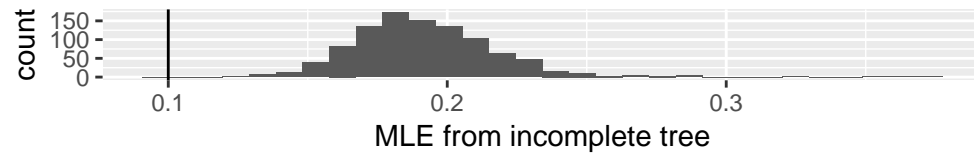
```
dmea::par_est_vis(P=MP,par=1,PR=RP)
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```



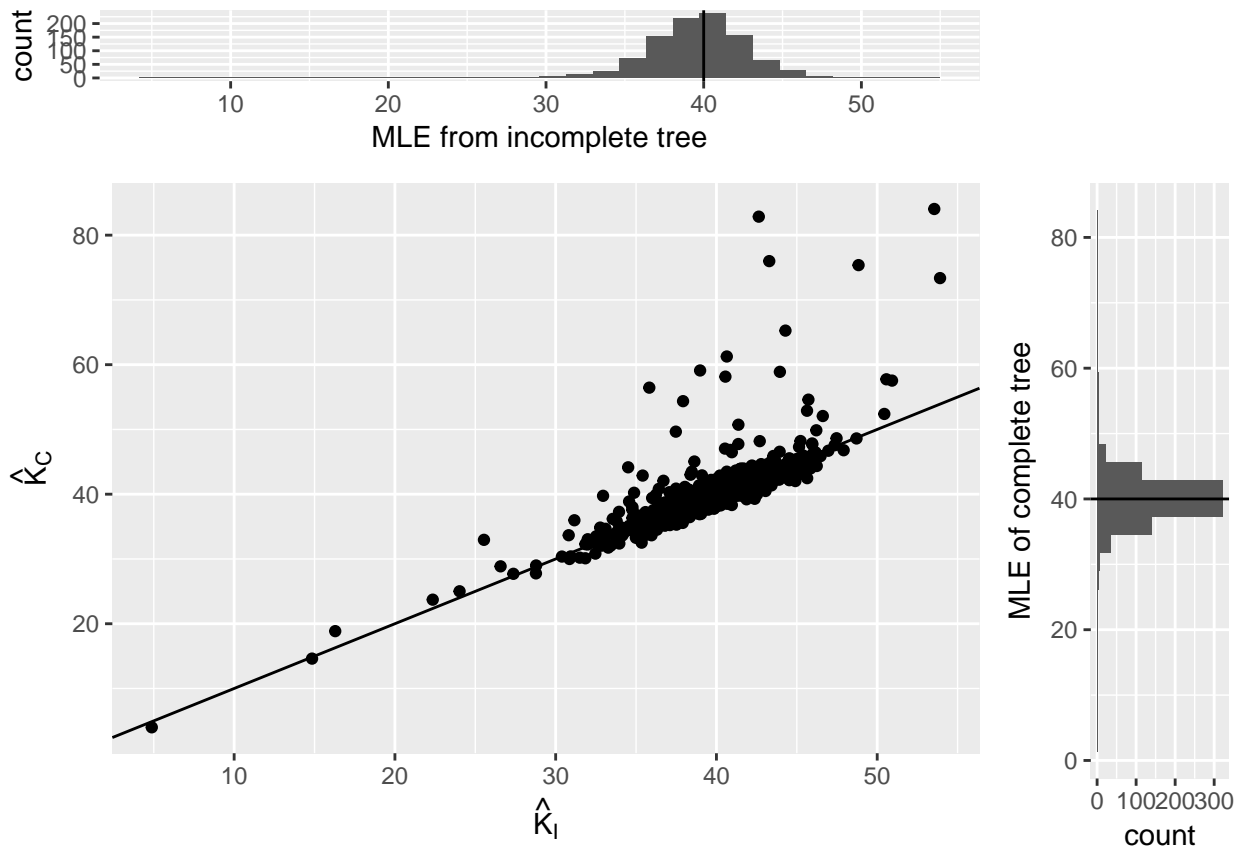
```
dmea::par_est_vis(P=MP,par=2,PR=RP)
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.  
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```



```
dmea::par_est_vis(P=MP,par=3,PR=RP)
```

```
## [1] "0.008000000000000001 proportion of data was excluded for vizualization purposes"  
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.  
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```



```
summary(MP)
```

```
##           V1           V2           V3
## Min.      :0.4618   Min.   :0.1268   Min.    : 4.876
## 1st Qu.:0.8207   1st Qu.:0.1750   1st Qu.:37.782
## Median :0.9204   Median :0.1892   Median :39.754
## Mean     :0.9190   Mean    :0.1924   Mean    :39.591
## 3rd Qu.:1.0188   3rd Qu.:0.2060   3rd Qu.:41.539
## Max.     :1.4345   Max.    :0.3772   Max.    :54.987
```

```
summary(RP)
```

```
##           V1           V2           V3
## Min.      :0.4374   Min.   :0.1166   Min.    :4.000e+00
## 1st Qu.:0.7565   1st Qu.:0.1848   1st Qu.:3.800e+01
## Median :0.8441   Median :0.2007   Median :4.000e+01
## Mean     :0.8570   Mean    :0.2023   Mean    :3.283e+11
## 3rd Qu.:0.9517   3rd Qu.:0.2185   3rd Qu.:4.200e+01
## Max.     :1.4282   Max.    :0.3850   Max.    :1.040e+14
```

$\mu_0 = 0.4$

```
time = proc.time()
n_sim = 1000
n_trees = 10
MP = matrix(nrow=n_sim,ncol=3)
RP = matrix(nrow=n_sim,ncol=3)
```

```

p = proc.time()
for(i in 1:n_sim){
  est = sim.est(n_trees=n_trees,pars=c(0.8,0.4,40),seed=i)
  RP[i,] = est$real
  MP[i,] = est$est
}
get.time(time)

```

```

## elapsed
## 3232.704

```

```

get.time(time)

```

```

## elapsed
## 3232.716

```

```

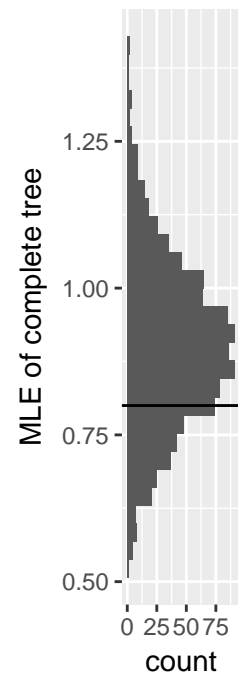
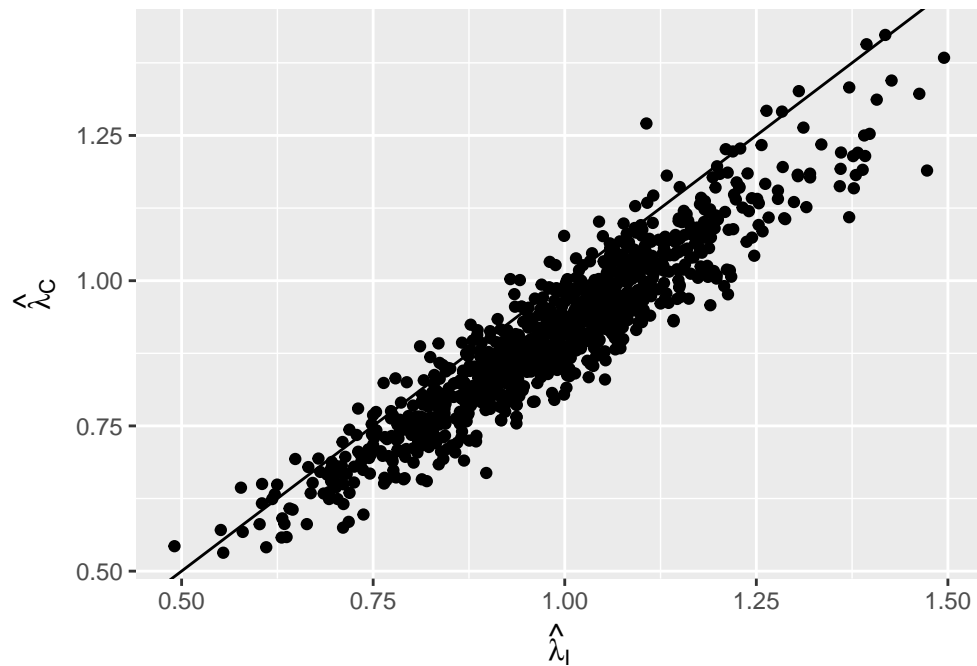
dmea::par_est_vis(P=MP,par=1,PR=RP)

```

```

## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.

```



```

dmea::par_est_vis(P=MP,par=2,PR=RP)

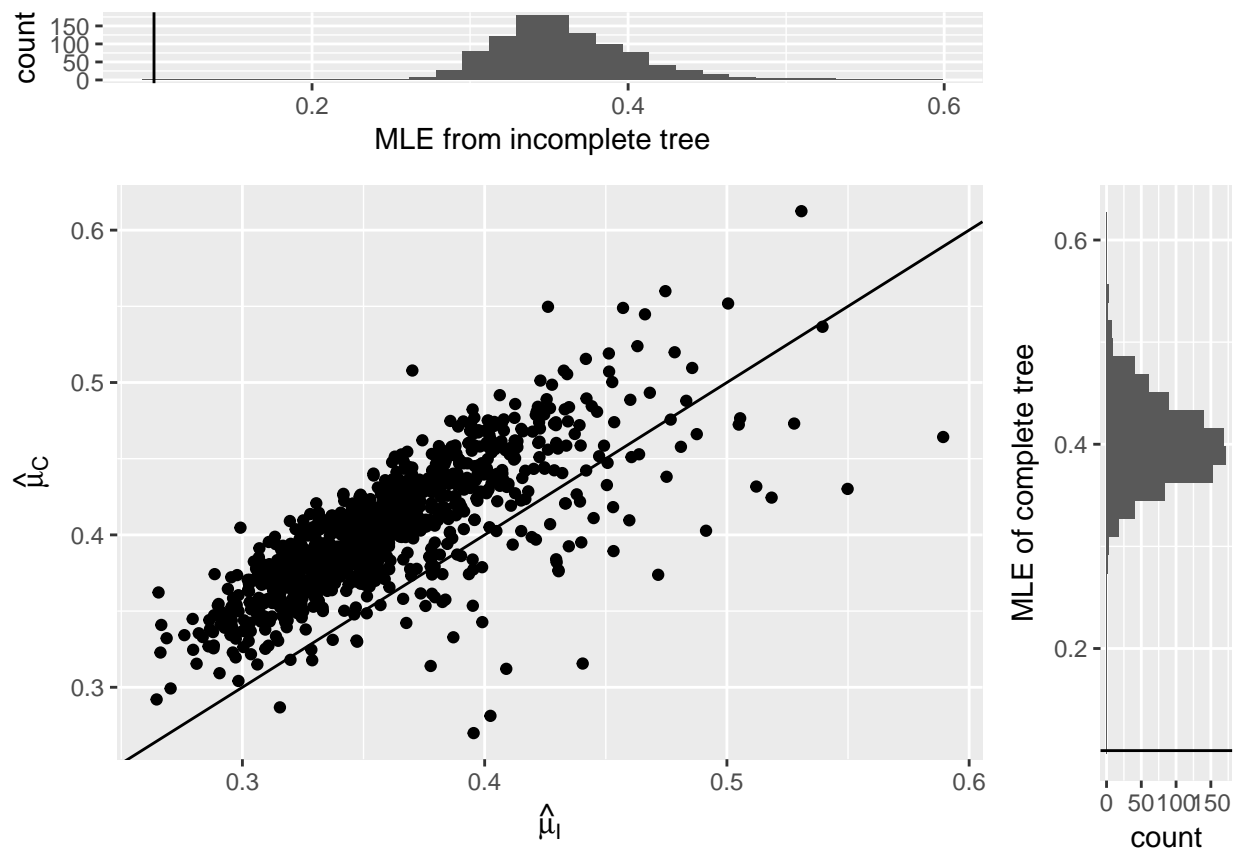
```

```

## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.

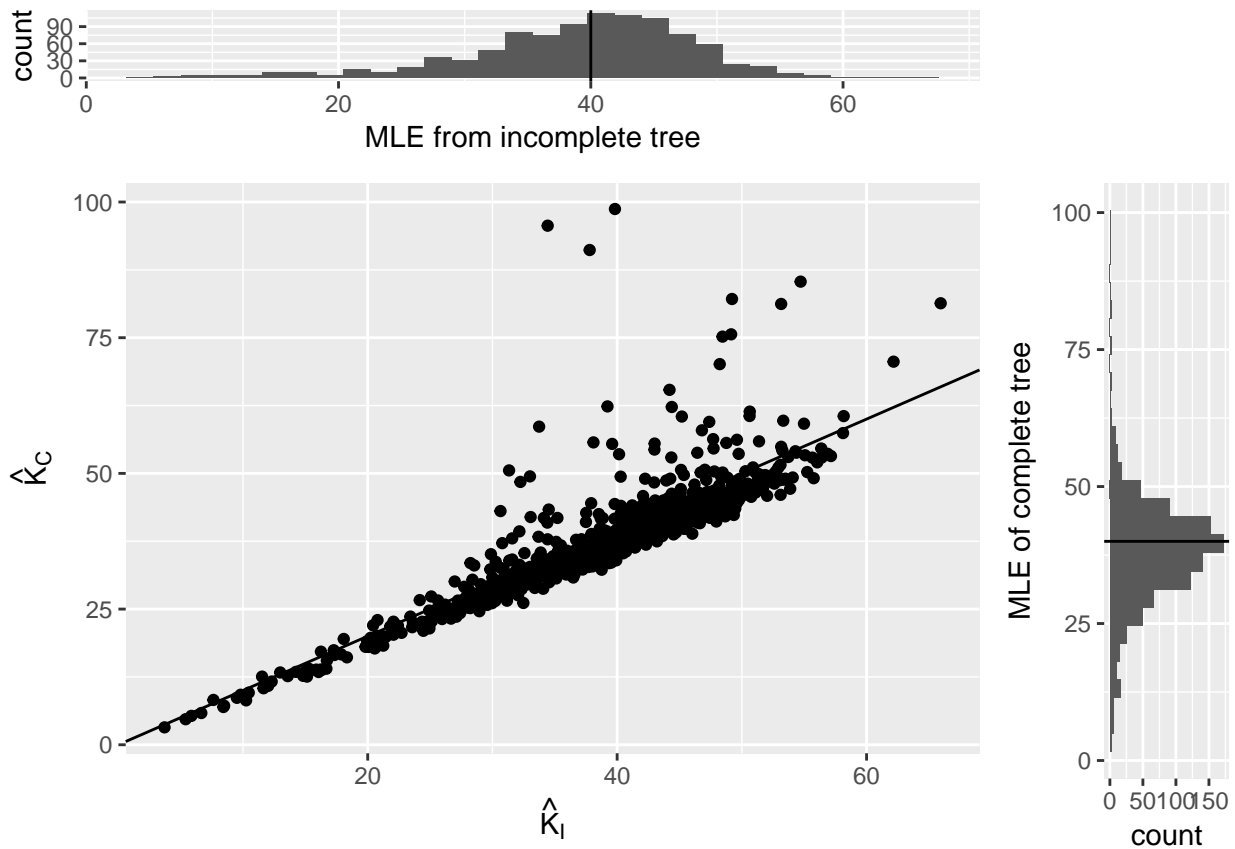
```





```
dmea::par_est_vis(P=MP,par=3,PR=RP)
```

```
## [1] "0.032 proportion of data was excluded for vizualization purposes"
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```



```
summary(MP)
```

##	V1	V2	V3
## Min.	:0.4907	Min. :0.2646	Min. : 3.708
## 1st Qu.:	:0.8770	1st Qu.:0.3304	1st Qu.: 34.555
## Median :	:0.9805	Median :0.3543	Median : 40.657
## Mean :	:0.9800	Mean :0.3598	Mean : 39.822
## 3rd Qu.:	:1.0736	3rd Qu.:0.3839	3rd Qu.: 45.265
## Max. :	:1.4950	Max. :0.5893	Max. :142.651

```
summary(RP)
```

##	V1	V2	V3
## Min.	:0.5317	Min. :0.2699	Min. :3.000e+00
## 1st Qu.:	:0.8051	1st Qu.:0.3757	1st Qu.:3.300e+01
## Median :	:0.8962	Median :0.4009	Median :3.900e+01
## Mean :	:0.9015	Mean :0.4030	Mean :1.679e+12
## 3rd Qu.:	:0.9902	3rd Qu.:0.4285	3rd Qu.:4.400e+01
## Max. :	:1.4230	Max. :0.6124	Max. :4.773e+14

more trees

```
time = proc.time()
n_sim = 1000
n_trees = 100
MP = matrix(nrow=n_sim,ncol=3)
RP = matrix(nrow=n_sim,ncol=3)
```

```

p = proc.time()
for(i in 1:n_sim){
  est = sim.est(n_trees=n_trees,pars=c(0.8,0.1,40),seed=i)
  RP[i,] = est$real
  MP[i,] = est$est
}
print(proc.time()-p)

```

```

##      user      system elapsed
## 8044.632      0.156 8045.623

```

```
get.time(time)
```

```

## elapsed
## 8045.629

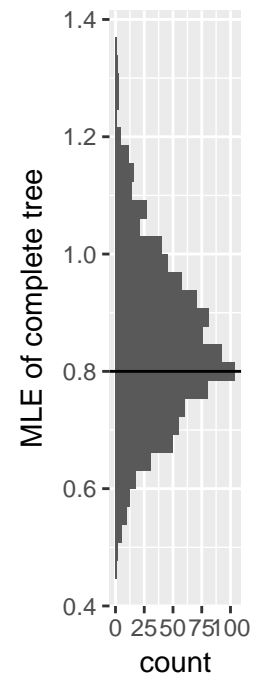
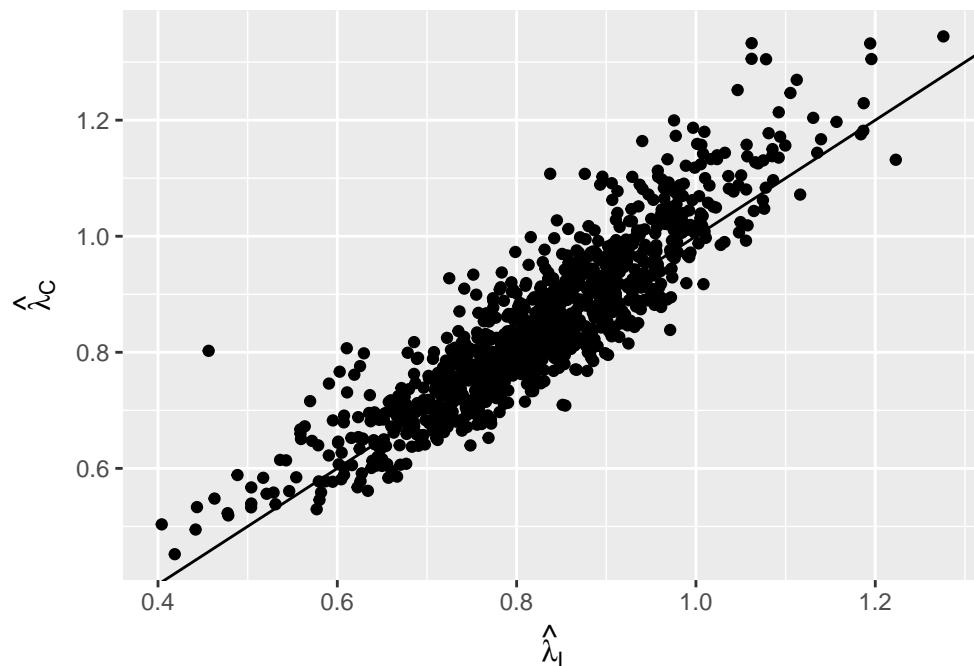
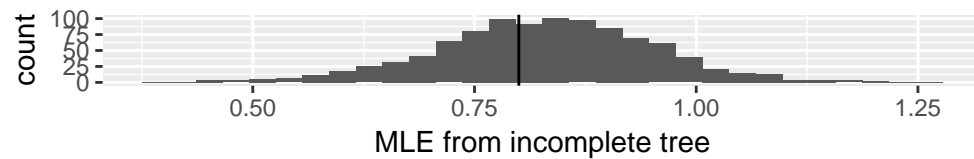
```

```
dmea::par_est_vis(P=MP,par=1,PR=RP)
```

```

## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.

```

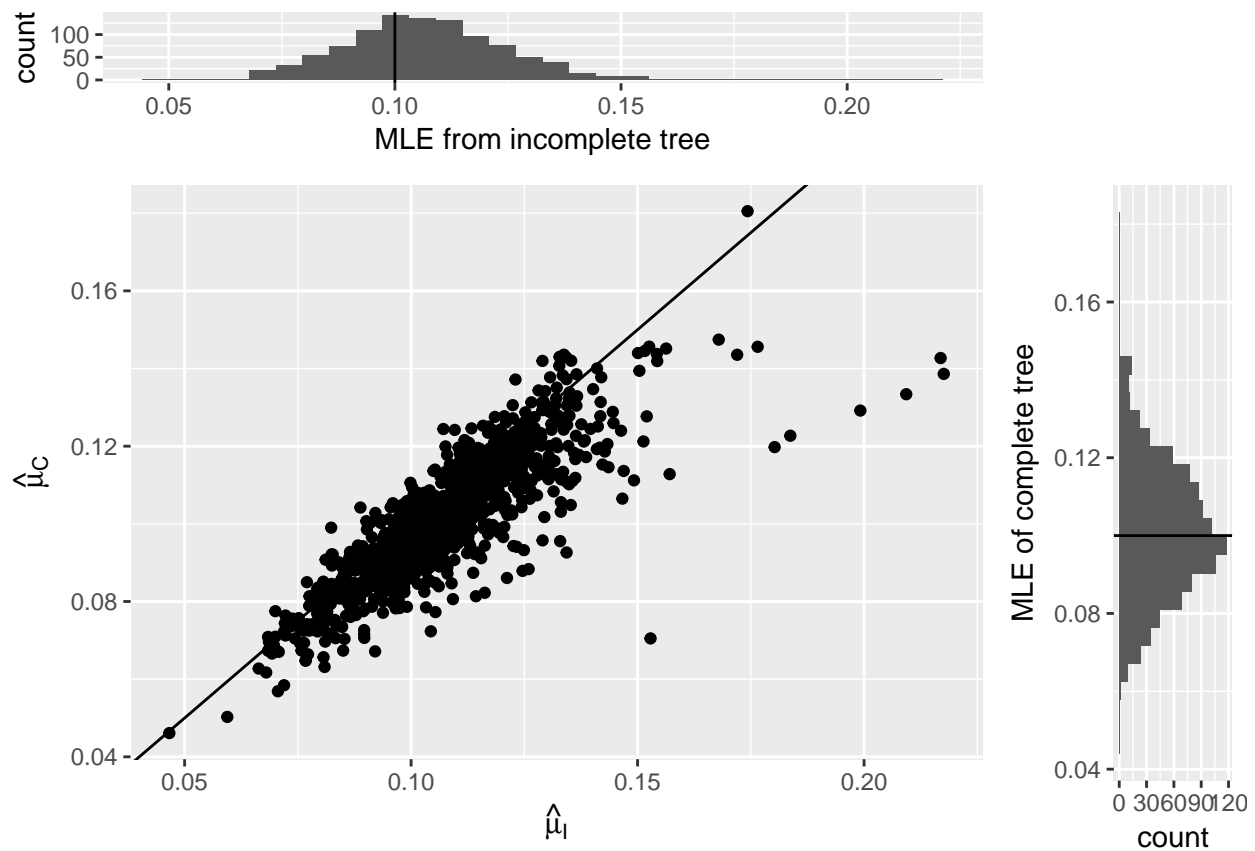


```
dmea::par_est_vis(P=MP,par=2,PR=RP)
```

```

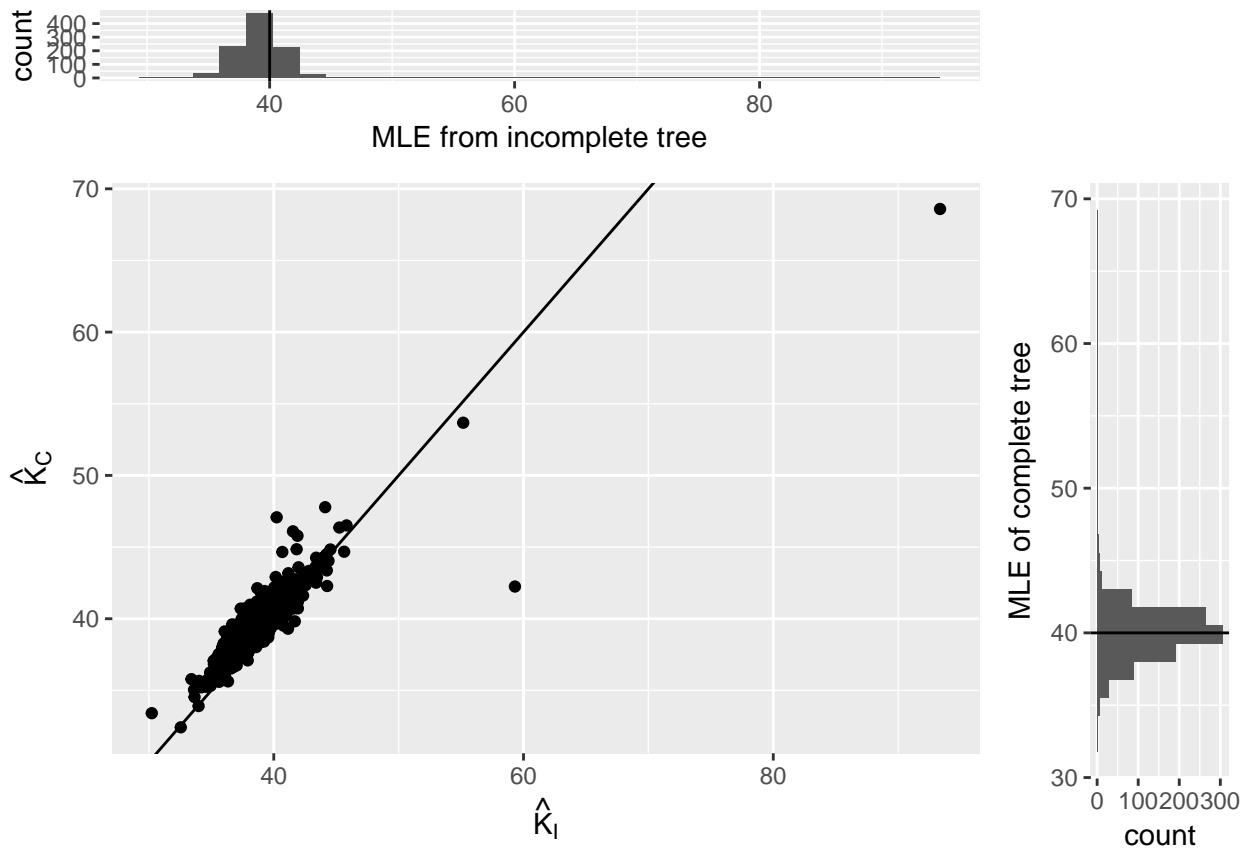
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.

```



```
dmea::par_est_vis(P=MP,par=3,PR=RP)
```

```
## [1] "0.003 proportion of data was excluded for vizualization purposes"
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```



`summary(MP)`

##	V1	V2	V3
##	Min. :0.4042	Min. :0.04663	Min. :30.23
##	1st Qu.:0.7543	1st Qu.:0.09528	1st Qu.:37.92
##	Median :0.8295	Median :0.10581	Median :39.20
##	Mean :0.8288	Mean :0.10716	Mean :39.23
##	3rd Qu.:0.9107	3rd Qu.:0.11774	3rd Qu.:40.29
##	Max. :1.2760	Max. :0.21760	Max. :93.36

`summary(RP)`

##	V1	V2	V3
##	Min. :0.4521	Min. :0.04611	Min. :3.200e+01
##	1st Qu.:0.7557	1st Qu.:0.08961	1st Qu.:3.900e+01
##	Median :0.8363	Median :0.10023	Median :4.000e+01
##	Mean :0.8497	Mean :0.10096	Mean :2.314e+11
##	3rd Qu.:0.9381	3rd Qu.:0.11241	3rd Qu.:4.100e+01
##	Max. :1.3443	Max. :0.18053	Max. :2.314e+14

**more trees**

```
time = proc.time()
n_sim = 1000
n_trees = 100
MP = matrix(nrow=n_sim,ncol=3)
RP = matrix(nrow=n_sim,ncol=3)
```

```

p = proc.time()
for(i in 1:n_sim){
  est = sim.est(n_trees=n_trees,pars=c(0.8,0.4,40),seed=i)
  RP[i,] = est$real
  MP[i,] = est$est
}
get.time(time)

```

```

## elapsed
## 27009.56

```

```

get.time(time)

```

```

## elapsed
## 27009.57

```

```

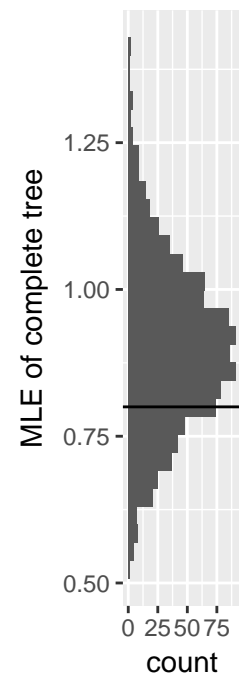
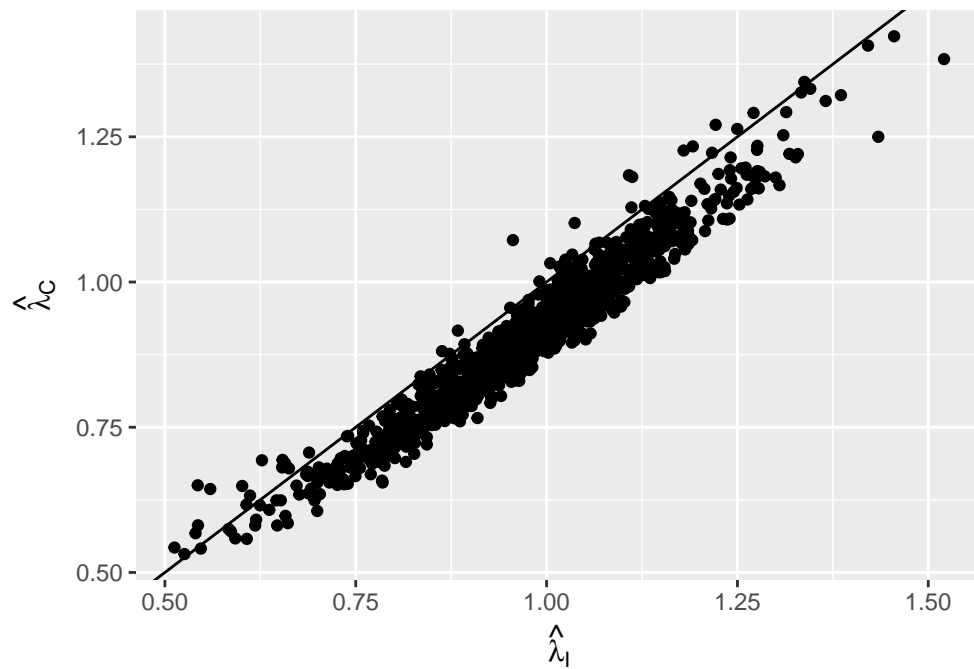
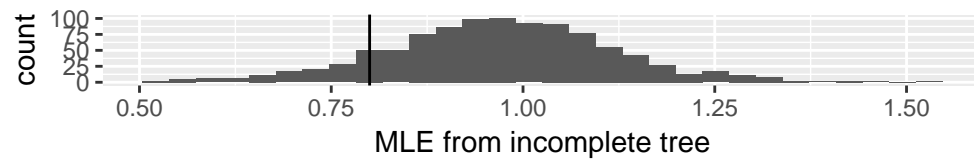
dmea::par_est_vis(P=MP,par=1,PR=RP)

```

```

## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.

```



```

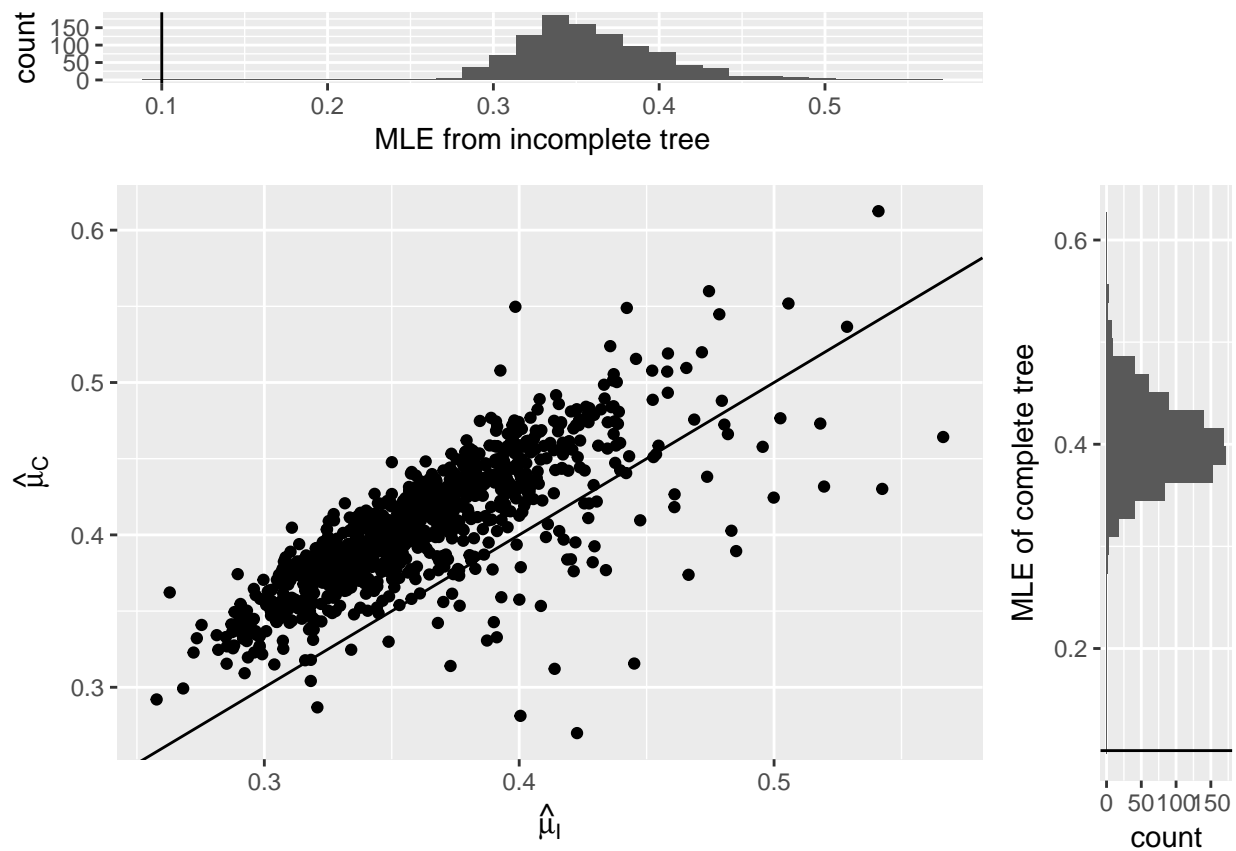
dmea::par_est_vis(P=MP,par=2,PR=RP)

```

```

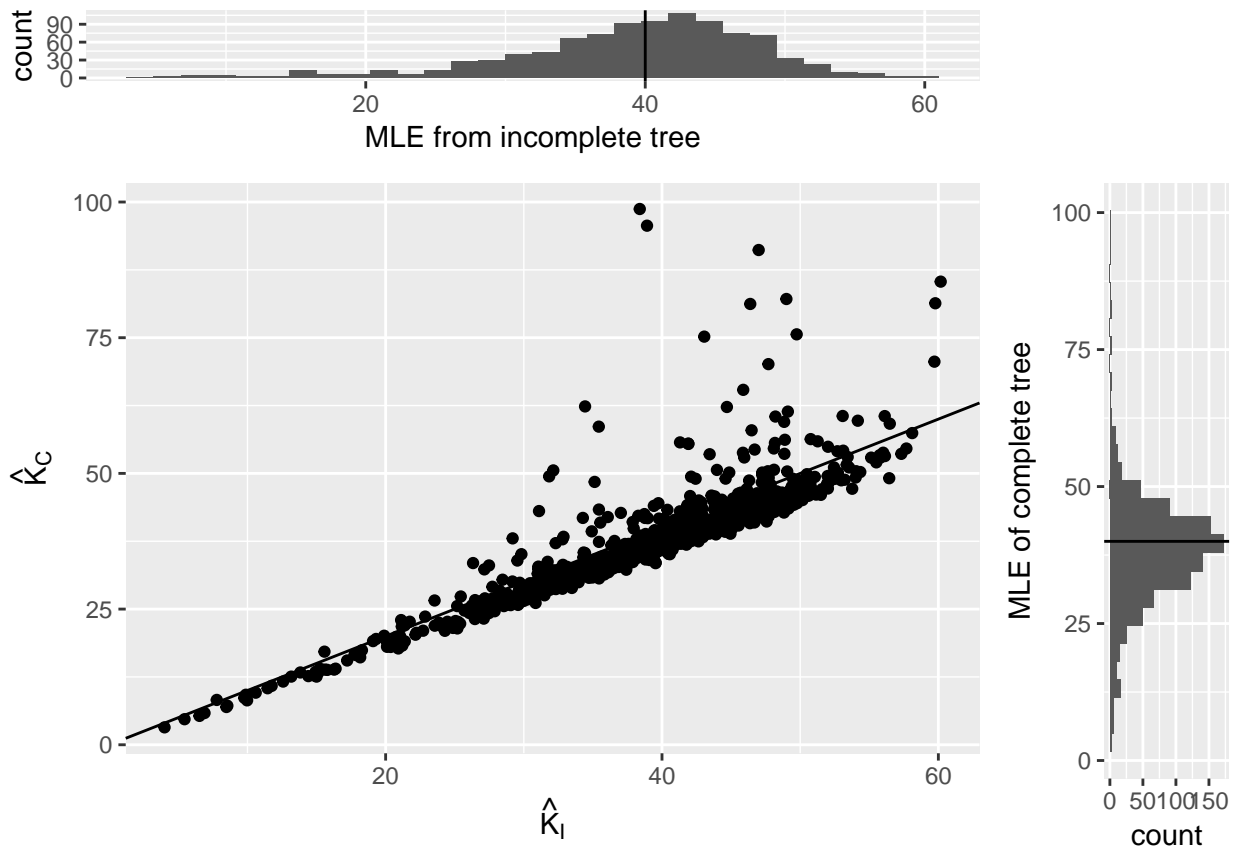
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.

```



```
dmea::par_est_vis(P=MP,par=3,PR=RP)
```

```
## [1] "0.032 proportion of data was excluded for vizualization purposes"
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```



```
get.time(time)
```

```
## elapsed
## 27012.65
```

```
summary(MP)
```

	V1	V2	V3
## Min.	:0.5126	Min. :0.2577	Min. : 3.998
## 1st Qu.	:0.8771	1st Qu.:0.3310	1st Qu.: 34.887
## Median	:0.9694	Median :0.3533	Median : 40.761
## Mean	:0.9690	Mean :0.3596	Mean : 40.281
## 3rd Qu.	:1.0633	3rd Qu.:0.3837	3rd Qu.: 45.622
## Max.	:1.5207	Max. :0.5664	Max. :165.823

```
summary(RP)
```

	V1	V2	V3
## Min.	:0.5317	Min. :0.2699	Min. :3.000e+00
## 1st Qu.	:0.8051	1st Qu.:0.3757	1st Qu.:3.300e+01
## Median	:0.8962	Median :0.4009	Median :3.900e+01
## Mean	:0.9015	Mean :0.4030	Mean :1.679e+12
## 3rd Qu.	:0.9902	3rd Qu.:0.4285	3rd Qu.:4.400e+01
## Max.	:1.4230	Max. :0.6124	Max. :4.773e+14