



# MyIPM Smartphone Series

Guido Schnabel, Clemson University



# Why We Did This Project

Provide growers and agents with **relevant and up-to-date information** anytime, anywhere

**Integrate** disease diagnostics, spray guide info, fact sheet info, disease and resistance management recommendations

**Simplify** information with interactive tables, pictures, audio, links

Provide a **resource for the specialist, grower, and field crew** (correct planting, diagnostics)

# Timeline

January	2012	Discussions, Planning, Funding
January	2013	Identification of suitable student programmer
January	2014	Release of Android,iOS MyIPM SouthEastern Disease app ( <b>SED</b> ); peach, strawberry)
September	2015	First workshop in Clemson (multiple Universities)
January	2016	Release of Android, iOS MyIPM (NorthEastern Disease app ( <b>NED</b> ); apple, pear, cherry, Cranberry; SouthEastern Pest app ( <b>SEP</b> ); peach, strawberry, blueberry
September	2016	Second workshop in Clemson
January	2017	Funding from S-IPM Center, NASGA, SRSFC (merge all 3 apps, add more information, more)

*3500 total downloads as of today (February 1, 2017)*



# The Original MyIPM Creators



Guido Schnabel  
Plant Pathologist



Roy Pargas  
Computer Science



Greg Edison  
Programmer



Mengjun Hu  
Scientist

## **Funding initially provided by**

- the Schnabel slush fund
- USDA Southern Region IPM Program
- Southeastern Small Fruit Consortium

## **Continued funding provided by**

- S-IPM Center
- NASGA
- SRSFC















# Active Contributors

	Clemson	Cornell	PSU	UMASS	NCSU	UGA	USDA / Rutgers/ UFL
<b>Plant Pathology</b>	Schnabel Hu	Cox <i>Gadoury</i>	Peter	Clements Rojas Cooley	Villani Cline Ritchie	Brannen	<i>Turechek</i> <i>Beckmann/</i>  <i>Lalancette/</i>  <i>Peres</i>
<b>Entomology</b>	P. Smith					Ahmad Little Blaauw	
<b>Software, Technical, Design</b>	Edison Dowling					LaForest Southern IPM Center	

# We Can Change Content And Push to Production ANY TIME- The Authoring Tool

MyIPM Admin Diseases - Peach admin

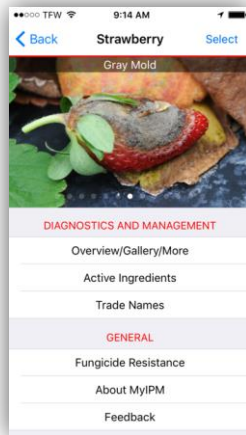
Active Trade Disease Resistance FRAC Types About

Trade	Active	Rate/ Acre	PHI/ Days	REI/ Hours	Field EIQ	Cnsmr. EIQ	Wrkr. EIQ	Eco. EIQ	Type	Action
<a href="#">Abound 2.08F &gt;</a>	Azoxystrobin (con)	6.0-15.5 fl oz	0	4	6	1.3	1.8	14.8	Conventional	  
<a href="#">Abound 2.08F &gt;</a>	Azoxystrobin (con)	12.3-15.4 fl oz	0	4	5.9	1.3	1.8	14.7	Conventional	  
<a href="#">ARMICARB 100 &gt;</a>	Potassium bicarbonate (org)	2.5-5.0 lb	0	4	34	8.5	25.5	68	Organic	  
<a href="#">Basic Copper Sulfate &gt;</a>	Basic Copper Sulfate (con)	-1	0	48	?	?	?	?	Conventional	  

myipm.bugwoodcloud.org/?app=1&fruit=2&page=guide

# MyIPM

## SMARTPHONE APPS



*MyIPM apps are available for Android and Apple phones and feature IPM information for fruit crops from regional specialists*



### A Smartphone App to Assist with Integrated Pest and Disease Management

- *Diagnostics Made Easy with Picture Gallery*
- *Interactive Tables* Featuring Active Ingredients, Trade Names, Efficacy, PHI, REI, Rates/Acre
- *Chemical, Biological, Cultural Control Options*
- *Pest and Pathogen Biology*
- *Audio from Specialists*
- *Resistance Management Tools*
- Maintained by *Leading Extension Specialists* of 6 Land-Grant Universities and the Southern Region IPM Center

*Three current apps to choose from:*

**MyIPM-SED** (Diseases of blueberry, strawberry and peach)

**MyIPM-SEP** (Pests of blueberry, strawberry and peach)

**MyIPM-NED** (Diseases of apple, pear, cherry, cranberry)

*Download for free in Google Play or Apple Store. Use M/EI due to large file*



# **Planned Improvements**

**(Funding from S-IPM Center, NASGA, SRSFC)**

- Merge all into one app, provide user the option to choose crops
- Add pests for apple, pear, cherry, and cranberries
- Add resistance management information for each ai
- Add product compatibility information (SEARCH feature)
- add an optional poll function
- Meet on a regular basis to update and improve



Switch to Live Demonstration

# MyIPM



MyIPM-SED



MyIPM-SEP



MyIPM-NED

**MyIPM-SED**, which stands  
for SouthEasternDiseases

**MyIPM-SEP**, for  
SouthEasternPests

and **MyIPM-NED**, for  
NorthEasternDiseases

## SouthEasternDiseases and SouthEasternPests

●●○○ VZW Wi-Fi

3:38 PM



🔍 Enter active ingredient or trade name



Strawberry

Peach

Blueberry

[Update](#)

## NorthEasternDiseases

●●○○ VZW Wi-Fi

3:39 PM



🔍 Enter active ingredient or trade name



Apple

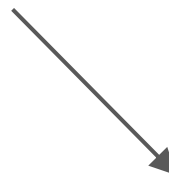
Pear

Cherry

Cranberry

[Update](#)

Note the **Update** button, which should be done frequently to make sure you have the latest data in the app!

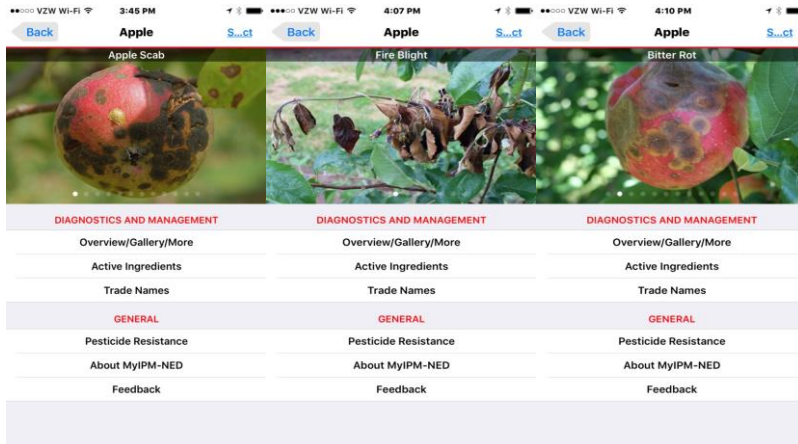


Lets use **NorthEasternDisease / Apple** as a crop example

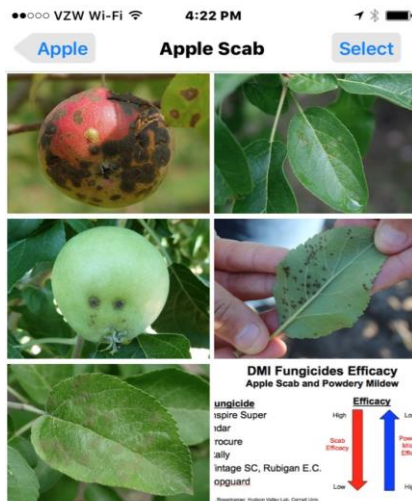
Scroll through the **Disease pictures** or us **SELECT** tab, settle on Apple Scab example

Choose **Overview/Gallery/More** to display basic biology and a bit of information on cultural control

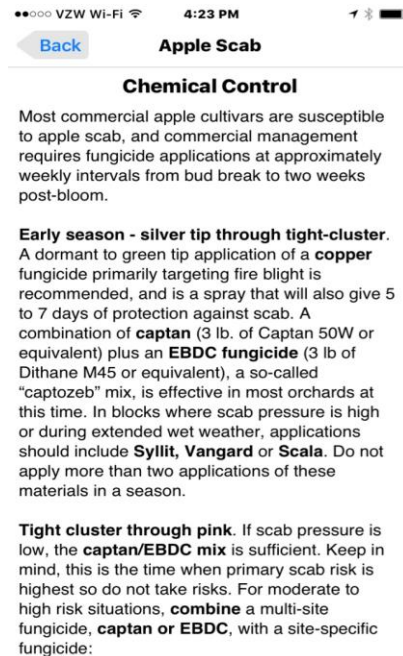
Play **Audio clip** from a University expert



Choose **Gallery** and **zoom in** by pinching and spreading with thumb and index finger



Choose **More** for in-depth information on Disease, and advice on Chemical Control, Pesticide Resistance Issues, and Non-Chemical Control options.



# MORE section

●●○○ TFW

10:30 AM

[Back](#)

Apple Scab

1 ●●○○ TFW

10:30 AM

[Back](#)

Apple Scab

1 ●●○○ TFW

10:30 AM

[Back](#)

Apple Scab

1 ●●○○ TFW

10:30 AM

[Back](#)

Apple Scab

## Apple Scab, *Venturia inaequalis*

### Symptoms & Signs

Apple scab can occur on any apple tissue, but are most commonly seen on leaves and fruit. Small, raised, fuzzy, olive-colored spots will first appear on fruit cluster leaves around bloom, or on early vegetative leaves and immature fruit after petal fall. On leaves, infections may be visible on the top or undersurface. These **primary lesions** will expand if untreated, turning yellow and eventually black. With extensive infections, the entire leaf turns yellow and drops. Leaves that are completely covered with scab are said to have "sheet scab". **Secondary lesions** are similar to the primary lesions, and develop on vegetative leaves or fruit through the growing season. Scab infections on **fruit** first appear as gray black spots that develop cracks as fruit grows. Tissue becomes brown and cracks around and in infections. Multiple

Most commercial apple cultivars are susceptible to apple scab, and commercial management requires fungicide applications at approximately weekly intervals from bud break to two weeks post-bloom.

**Early season - silver tip through tight cluster.** A dormant to green tip application of a **copper** fungicide primarily targeting fire blight is recommended, and is a spray that will also give 5 to 7 days of protection against scab. A combination of **captan** (3 lb. of Captan 50W or equivalent) plus an **EBDC fungicide** (3 lb of Dithane M45 equivalent), a so-called "captoze" mix effective in most orchards at this time. In blocks where scab pressure is high or during extended wet weather, applications should include **Syllit**, **Vanguard** or **Scala**. Do not apply more than two applications of these materials.

## Chemical Control

## Specific Resistance Issue

Fungicide resistance can make apple scab management much more difficult. Apple scab has developed resistance to most fungicides in at least a few parts of the U.S., and the risk of resistance is high for single-site fungicides. Once resistance to a fungicide class is established in an orchard, that class is no longer a control option. It is important to keep options, and manage fungicide resistance.

The following risk management rules are recommended.

1. Use a **sanitation** program to manage inoculum.
2. Use a **multi-site fungicide in every spray** - FRAC groups M3 and M4 - **captan**, **mancoze** or **metiram**.
3. Change **site-specific fungicides** - FRAC groups 3, 7, 9 and 11.
4. Use **at least three active ingredients** from three different FRAC groups over the primary scab season.

## Non-Chemical Control

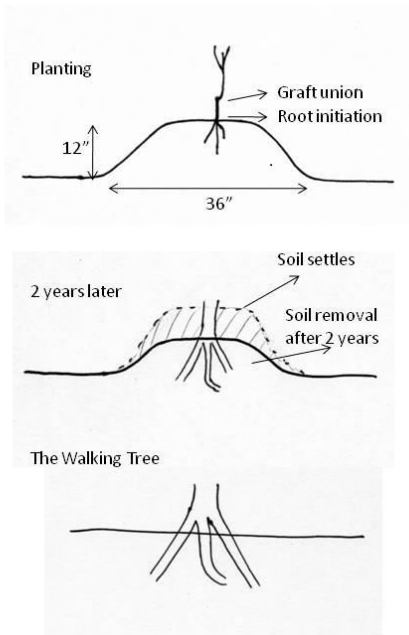
### Sanitation

Sanitation targets overwintered inoculum, reducing it and subsequent risk of infection and the magnitude of epidemics that may occur. Leaves on the orchard floor are swept and ground up using mowers or flail choppers in the spring before bud break. In addition, as an alternative, 5% urea may be sprayed on trees just before leaf drop in the fall, or to the orchard floor after leaves drop in fall or spring. Both chopping and a urea spray may be used for more effective control.

### Resistant Varieties

Apple varieties vary in their susceptibility to apple scab, and some cultivars are resistant to scab. Cultivars such as 'McIntosh', 'Cortland', and 'Empire' are susceptible, while 'Golden Delicious' and related cultivars are less susceptible. 'Honeycrisp' is somewhat resistant to

# MORE section is supported by GALLERY pictures





Apple

Apple Scab

Select

Conventional

Organic

Active Ingredient

FRAC Code

Efficacy

Benzovindiflupyr

7

++++

Boscalid; Pyraclostrobin

7; 11

++++

Captan

M4

++++

Copper hydroxide

M1

+++

Copper hydroxide; Copper oxychloride

M1; M1

+++

Cyprodinil

9

+++

Difenoconazole; Cyprodinil

3; 9

++++

Dodine

U12

+++

Fenarimol

3

++++

Fenbuconazole

3

++++

Fluopyram; Pyrimethanil

7; 9

+++

Fluopyram; Trifloxystrobin

7; 11

++++

Flutriafol

3

+++

Fluxapyroxad; Pyraclostrobin

7; 11

++++

Kresoxim-methyl

11

++++

List **Active Ingredients** registered to control the Disease. **FRAC Codes** correspond to colors.

Knowing what FRAC/color code you sprayed last will help you **choose a fungicide for your next spray with a different mode of action** for resistance management.

For example, if I used the Boscalid /Pyraclostrobin (7/11) combination in my last fungicide spray, I might choose a different fungicide combination for my next spray. For example, the Difenconazole /Cyprodinil, 3/9, blue/brown combination. Or Captan, M4 black.



Not sure what the Boscalid/Pyraclostrobin combination **Trade Name** is? Simply tap on it to display **Trade Name**, **Active Ingredient**, **Rate/Acre**, **Pre-Harvest-Interval** and **Re-Entry-Interval**, and **Field EIQ**, the latter being a relative ranking of the overall toxicity of the fungicide.

●●○○ VZW Wi-Fi 11:11 AM

Apple Scab Apple Scab

Trade Name	Active Ingredient	Rate/Acre
Pristine	Boscalid; Pyraclostrobin	14.5-18.5 oz

●●○○ VZW Wi-Fi 10:05 AM

Apple Scab Apple Scab

Trade Name	PHI (days)	REI (hrs)
Pristine	0	12

Similarly, **what is the Difenoconazole/Cyprodinil Trade Name?** Well, it's Inspire Super. Thus, rotating sprays of Pristine and Inspire Super (among others) is a good resistance management strategy for Apple Scab.

●●○○ VZW Wi-Fi 10:06 AM

Apple Scab Apple Scab

Trade Name	Active Ingredient	Rate/Acre
Inspire Super	Difenoconazole; Cyprodinil	14.5-18.5 oz

Going back to the main Disease screen, you can also choose **Trade Names** and get a list of all Trade Names used to control the Disease, including **Conventional and Organic options**.

A hidden feature is that most of the **columns can be sorted** by clicking on the heading, for example EIQ if you want to quickly know what fungicide has the lowest (or highest!) Field EIQ.

●●○○○ VZW Wi-Fi 10:04 AM

Apple Apple Scab Select

Conventional Organic

Trade Name	Active Ingredient
Aprovia	Benzovindiflupyr
Badge SC	Copper hydroxide; Copper oxychloride
Badge SC	Copper hydroxide; Copper oxychloride
Captan 4L	Captan
Captan 50W	Captan
Captan 80WDG	Captan
Captan Gold 4L	Captan
Captan Gold 80WDG	Captan
Captec 4L	Captan
Champ Dry Prill	Copper hydroxide
Champ Formula 2 Flowable	Copper hydroxide
Dithane M45 3 lb	Mancozeb
Dithane M45 6 lb	Mancozeb
Flint	Trifloxystrobin
Fontelis	Penthiopyrad

Touch for Organic control options

●●○○○ VZW Wi-Fi 10:04 AM

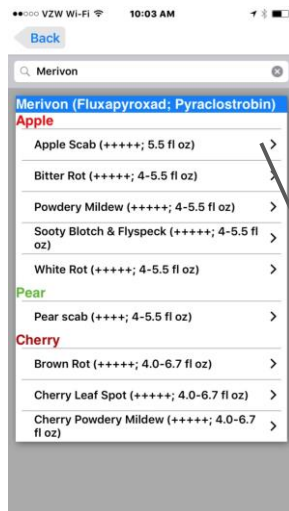
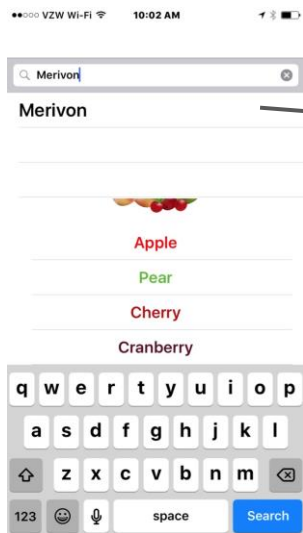
Apple Apple Scab Select

Conventional Organic

Trade Name	REI (hrs)	Field EIQ
Rubigan E.C.	30	1.6
Vintage SC	24	1.6
Flint	12	3.0
Indar 2F	12	4.1
Vanguard 75 WG	12	6.3
Inspire Super	12	7.4
Topguard	12	7.9
Scala SC	12	8.0
Procure 480 SC	12	8.6
Topsin 4.5 FL	24	13.4
T-Methyl 4.5 F	24	13.8
Syllit FL	48	13.9
Pristine	12	14.6
Thiophanate Methyl 85 WDG	48	16.2
Topsin M WSB	24	16.7

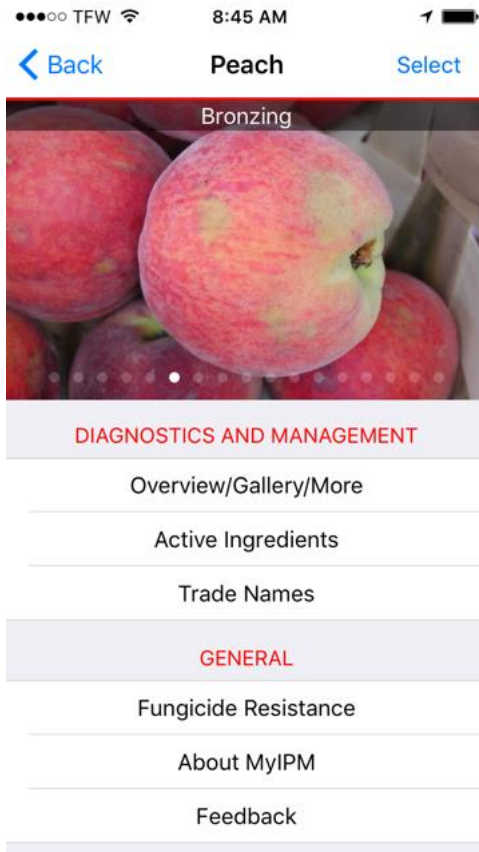
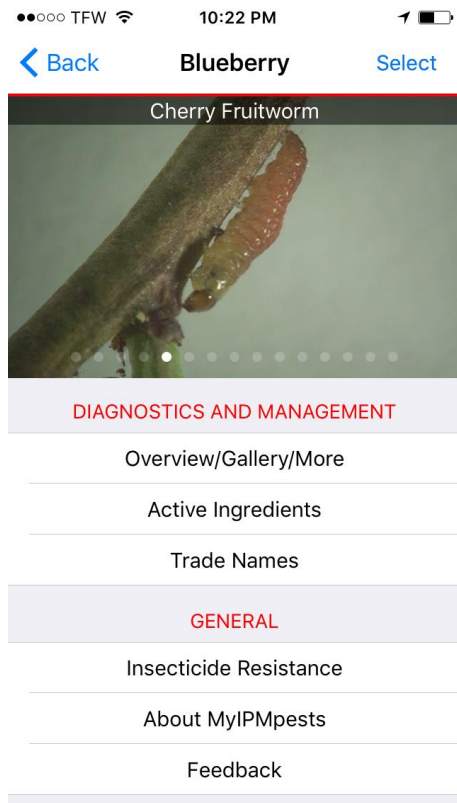
Touch any column heading to sort, here ascending on EIQ

Going back to the HOME screen, note the **Search** feature for active ingredients or trade names at the top. Type in a trade name and you get a quick **list of the crops** it can be used on, along with **efficacy and rate**. Touching Apple Scab, will result in the list of active ingredients with the one chosen flashing briefly, here it is second from the bottom highlighted (and flashing!) in red.

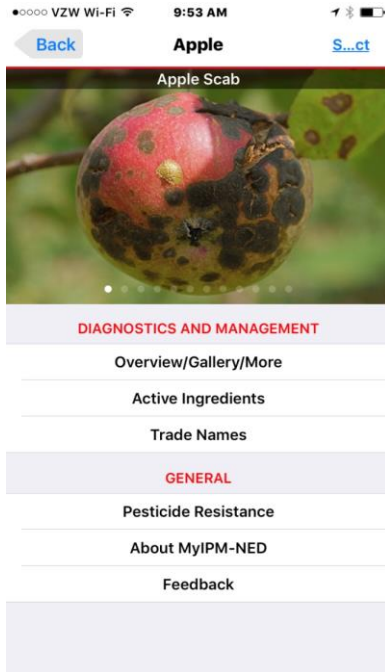


Active Ingredient	FRAC Code	Efficacy
Benzovindiflupyr	7	++++
Boscalid; Pyraclostrobin	7; 11	++++
Captan	M4	++++
Copper hydroxide	M1	+++
Copper hydroxide; Copper oxychloride	M1; M1	+++
Cyprodinil	9	+++
Difenoconazole; Cyprodinil	3; 9	++++
Dodine	U12	+++
Fenarimol	3	++++
Fenbuconazole	3	++++
Fluopyram; Pyrimethanil	7; 9	+++
Fluopyram; Trifloxystrobin	7; 11	++++
Flutriafol	3	+++
<b>Fluxapyroxad; Pyraclostrobin</b>	<b>7; 11</b>	<b>++++</b>
Kresoxim-methyl	11	++++

Remember that the MyIPM series now also includes **PESTS** and we strive to add more pests for more crops over the years. We have also included **SKIN DAMAGE and DISORDERS**.



Finally, going back to the home screen, there is some **GENERAL** information on Pesticide Resistance, About MyIPM-NED, and the opportunity to provide Feedback.



●○○○○ VZW Wi-Fi 9:53 AM

Apple

About

**MyIPM-NED (MyIntegratedPestManagement - NorthEastDiseases.** The 'northeast' designation implies that these crops are more frequently grown in this region. However, the information provided is relevant for other eastern states as well.

#### **Development and Design:**

Guido Schnabel & Mengjun Hu, Clemson University

Sara Villani, North Carolina State University

Jon Clements, Dan Cooley, & Erika Rojas, University of Massachusetts Amherst

Kerik Cox, Cornell University

Kari Peter, Pennsylvania State University

#### **Programming:**

Greg Edison & Roy Pargas, Computer Science, Clemson University

#### **Logo Design:**

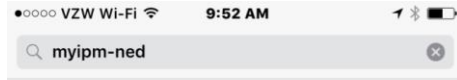
Madeline Dowling, Clemson University

#### **Primary Target Audience:**

Growers, Consultants, Extension, and Specialists in the Eastern United States

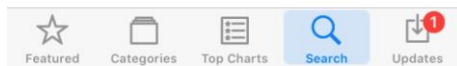
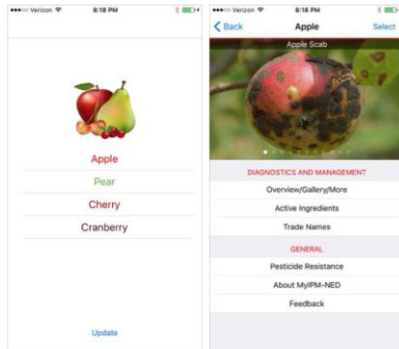
#### **Sources:**

**The efficacy values** for active ingredients are from the most recent Tree Fruit Production



**MyIPM-NED**  
Guido Schnabel

OPEN



We hope you download and give **MyIPM** a try. Simply **SEARCH** for MyIPM on the Apple Store or Google Play. **Provide Feedback** on improving MyIPM as we are constantly trying to make this app even better.

**Note:** if anything is not working after an update, delete and reinstall the app

Thanks for listening...